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FOREST SERVICE

2410 Plans
Timber Management Plan
for
Rio Grande National Forest
Region 2
7/1/74 - 6/30/84

APPROVED 8/19/75

U. S. DEPARTMENT OF AGRICULTURE

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Rio Grande National Forest
Region 2
7/1/74 - 6/30/84

APPROVED 8/19/75

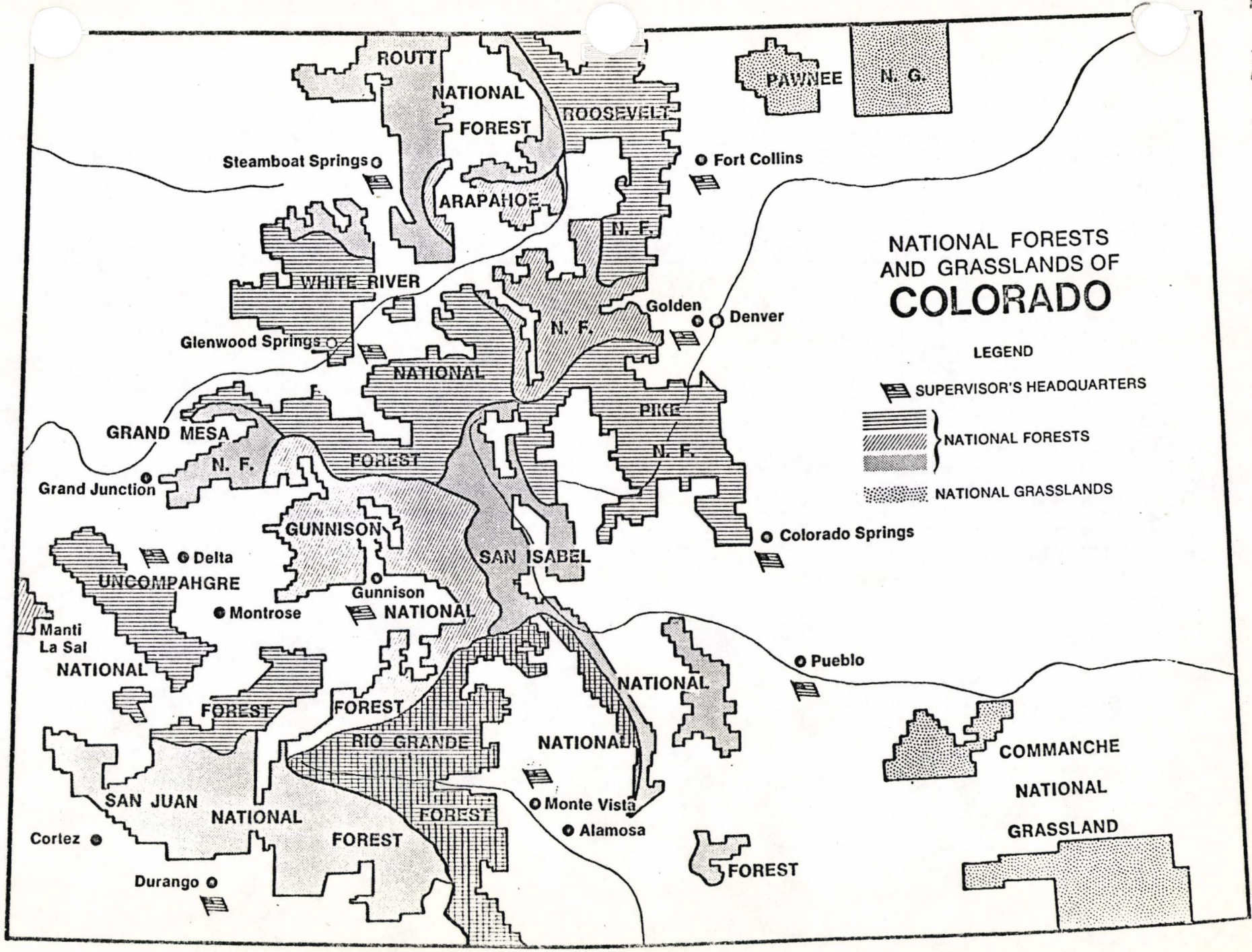
TIMBER MANAGEMENT PLAN

RIO GRANDE NATIONAL FOREST

Prepared by: Robert J. Jackson Date 7/22/75
Forest Silviculturist

Recommended by: J. R. Mathers Date 7/24/75
Forest Supervisor

Approved by: [illegible] Date 8/19/75
Regional Forester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GUNNISON
Colorado Springs
SAN ISABEL
Delta
UNCOMPAHGRE
Gunnison
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La Sal
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FOREST
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COMMANCHE
NATIONAL
GRASSLAND
Monte Vista
Alamosa
SAN JUAN
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FOREST
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Cortez
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Durango
NATIONAL FORESTS
AND GRASSLANDS OF
COLORADO
LEGEND
SUPERVISOR'S HEADQUARTERS
NATIONAL FORESTS
NATIONAL GRASSLANDS

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RIO GRANDE NATIONAL FOREST

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POTENTIAL YIELD STATEMENT

Rio Grande National Forest - 09

Effective Period FY 75 Thru 84

Approved _____
Regional Forester

Date 8/19/75

POTENTIAL YIELD STANDARD, SPECIAL AND MARGINAL

	Acres	Sawtimber		Products	
	M	M Cunits	MMBF	M Cunits	M Cords
Standard - Total	73.2	438.2	213.86	167.55	186.2
Group, Patch, Strip Shelterwood	14.2	104.3	50.88	25.52	28.4
Preparatory	13.9	54.1	26.41	37.90	42.1
Overstory Removal	45.1	279.8	136.57	104.13	115.7
Reforestation	(6.0)				
Special - Total	6.7	35.9	17.51	15.52	17.2
Group, Patch, Strip Shelterwood	.7	4.3	2.11	3.27	3.6
Preparatory	4.0	18.9	9.20	7.55	8.4
Overstory Removal	2.0	12.7	6.20	4.70	5.2
Marginal - Total	44.5	258.4	126.13	100.02	111.2
Group, Patch, Strip Shelterwood	6.7	49.0	23.92	12.04	13.4
Preparatory	9.0	42.4	20.70	24.54	27.3
Overstory Removal	28.8	167.0	81.51	63.44	70.5
Reforestation 1/	(19.0)	(6.4)	(3.10)	(3.25)	(3.6)
TSI 2/	(9.4)	(9.7)	(4.72)	(4.95)	(5.5)
Commercial Thinnings 2/	(40.6)	(41.7)	(20.38)	(21.37)	(23.7)
Total Potential Yield (S, S&M)	124.4	732.5	357.50	283.09	314.6
Unregulated Estimated Salvage	Various	102.0	50.0	Not Estimated	

1/ Increases due to this activity are earned at the rate of 62 bd. ft. per acre per year for each acre reforested since plan revision and will be harvested from standard areas. Reflects net effect on potential yield and not necessarily growth response on a given acre.

Yields from the first 6,000 acres of reforestation are included in the yields for Standard and Special. Increases for reforestation in excess of 6,000 acres will be added up to a maximum of 5,000 acres.

2/ Increases due to these activities are earned at the rate of 502 bd. ft. for each acre accomplished the previous full fiscal year and will be harvested from standard areas. Increases may be added for a maximum of 50,000 acres.

(Based on RAM Runs B2E2, D15, D18 and D3E)

PROGRAMMED ALLOWABLE HARVEST STATEMENT

Rio Grande National Forest - 09 Fiscal Year 76

Approved _____
Forest Supervisor

Date 7/24/75

Annual Programmed Allowable Harvest

	Acres	Sawtimber		Products	
	M	M Cunits	MMBF	M Cunits	M Cords
Standard - Total	5.1	35.8	17.5		
Group, Patch, Strip Shelterwood	0.5	6.1	3.0		
Preparatory	0.5	2.0	1.0		
Overstory Removal	4.1	27.7	13.5		
Special - Total	0.8	4.1	2.0		
Shelterwood					
Preparatory	0.7	3.7	1.8		
Overstory Removal	0.1	.4	0.2		
Unregulated - Total	0.1	1.0	.5		
Salvage	(6.0)	(4.1)	(2.0)		
Total Programmed Allowable Harvest	6.0	40.9	20.0		

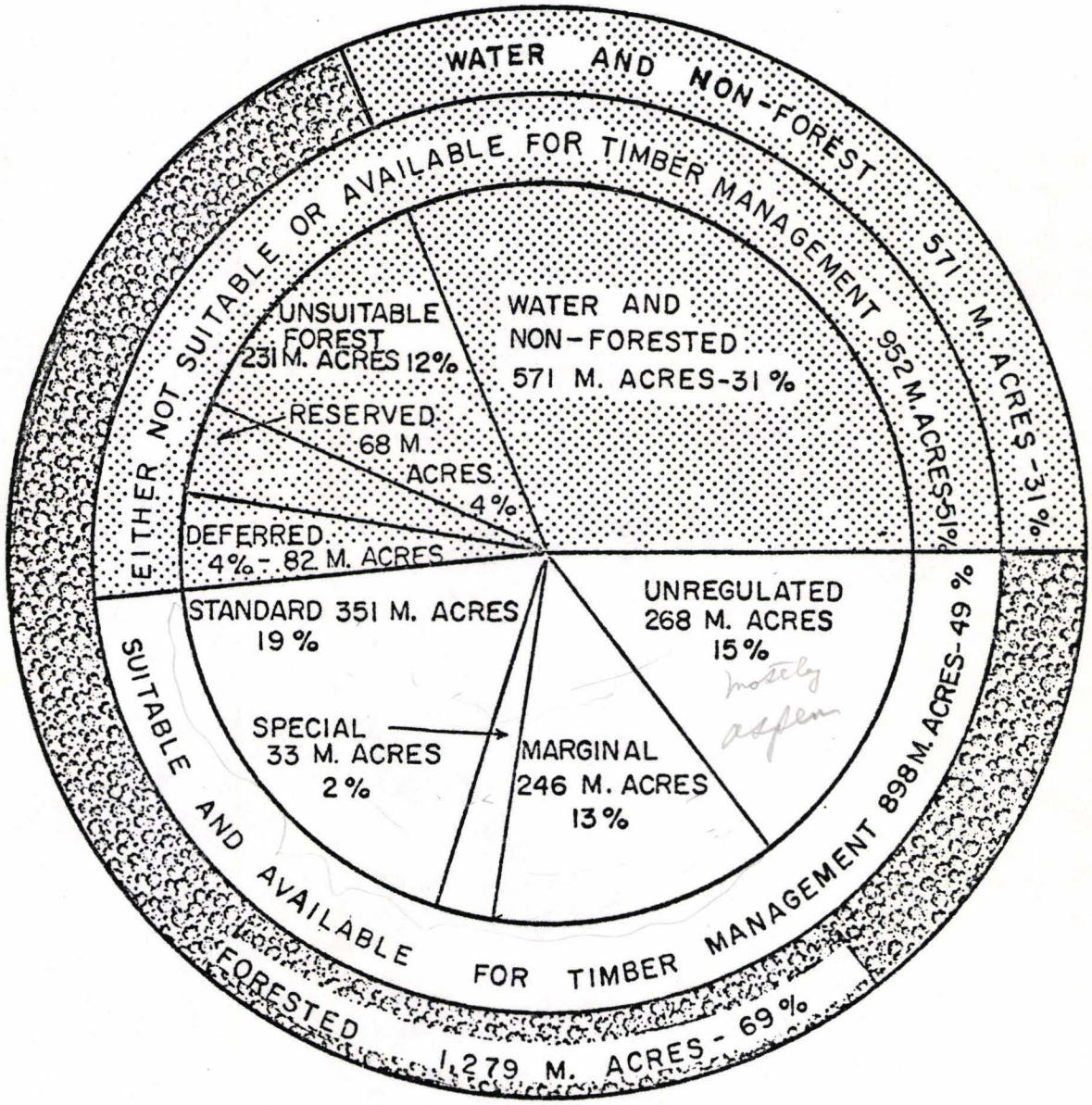
STANDARD LAND USE CLASSIFICATION FOR TIMBER MANAGEMENT

Rio Grande National Forest — Fiscal Years 1976 Through 1984

	Unsuitable	Suitable	
		Unavailable	Available
Net National Forest Area			
Land — Water	5,522		
Forested — Non-Forested	565,251		
Suitable — Unsuitable Forested	231,192		
Available — Unavailable			
Forested Deferred		81,896	
Forested Reserved		68,346	
Standard Component			351,046
Special Component			
Water-Travel Zones			33,382
Marginal Component			
Reforestation Backlog			135,903
Steep Slopes			103,354
Unstable Soils			6,814
Unregulated Component			
Administrative Sites			3,410
Unregulated Types			
Aspen			249,657
White Pine			14,272
Sub Totals	801,965	150,242	897,838
TOTAL NET NATIONAL FOREST AREA			1,850,045

Rio Grande National Forest

Standard Land Use Classifications
Based on Suitability, Availability
and
Need for Timber Management


WATER AND NON-FOREST
571 M. ACRES - 31%
EITHER NOT SUITABLE OR AVAILABLE FOR TIMBER MANAGEMENT 952 M. ACRES-51%
UNSUITABLE FOREST 231 M. ACRES 12%
WATER AND NON-FORESTED 571 M. ACRES-31%
RESERVED 68 M. ACRES 4%
DEFERRED 4% - 82 M. ACRES
STANDARD 351 M. ACRES 19%
UNREGULATED 268 M. ACRES 15%
mostly aspen
SPECIAL 33 M. ACRES 2%
MARGINAL 246 M. ACRES 13%
SUITABLE AND AVAILABLE FOR TIMBER MANAGEMENT 898 M. ACRES - 49%
FORESTED 1,279 M. ACRES - 69%

Total Net National Forest Area 1,850,045 Acres

M-Thousand

CIRCLE CHART I

II. INTRODUCTION

Upon approval by the Regional Forester, this plan will supersede the Timber Management Plan for the Rio Grande Working Circle approved by the Chief of the Forest Service, August 24, 1962, for the period July 1, 1962 through June 30, 1972, as extended.

The plan objective is to provide continued direction in the coordinated management and administration of the timber resource with other key values on the Rio Grande National Forest. It is applicable to the entire National Forest.

The Timber Management Plan was developed in conformance with the objectives and management guides in the Rocky Mountain Region Multiple Use Guide and latest revision of the individual Ranger District Multiple Use Plans. This plan is subordinate to the Multiple Use Plan and will be amended as necessary to achieve changing objectives established through environmental management and land use planning policy.

Prescribed actions and objectives of the plan were coordinated with other resources and disciplines through an Environmental Analysis and Impact Statement prepared by an Interdisciplinary Team composed of professional resource specialists with experience and technical training in diverse aspects of land management. Represented on the team, in addition to the five basic resources (timber, wildlife, range, recreation and water), were specialists in soils, engineering and landscape management.

A copy of the Environmental Impact Statement is on file in the Forest Supervisor's Office of the Rio Grande National Forest, Monte Vista, Colorado, and in the Regional Forester's Office, Denver, Colorado.

Although the specific period covered by the plan is ten years, the total planning horizon used for area regulation was 280 years, (two complete rotations for spruce-fir). This was accomplished by using a computerized method of developing long range management plans. The program used is a simulation model called RAM (Resource Allocation Model) developed by the Pacific Southwest Forest and Range Experiment Station, Berkeley, California.

A glossary is included in the appendix for familiarization with terminology used in the plan. All board foot tabulations are in Scribner scale. These may, however, be converted to International scale through multiplication by the factor 1.2147. To convert to cubic feet, multiply Scribner scale by 0.2049. 4.88 bd. ft/cubic foot

The appendix includes additional conversion factors along with reference material and maps too lengthy or bulky to include in the narrative section of the plan.

III. Comparison Between This Plan and Previous Plan

Statistics for this plan were developed from a re-inventory of the timber resource conducted in 1968. The re-inventory Plan containing the sample design, procedures and related material is on file in the Forest Supervisor's Office of the Rio Grande National Forest, Monte Vista, Colorado.

The previous plan statistics were based on an inventory conducted in 1959. That inventory plan is also available for review at the above address. Area under Forest Service administration was determined from the ANNUAL STATISTICAL REPORT (USDA Form 5400-22) applicable at plan writing time.

Differences in criteria between the old inventory and the new improved inventory makes direct comparison difficult. For example, in 1959 a tree had to be 11.0 inches in diameter to be "sawtimber". Due to changes in utilization, the new inventory classed trees as "sawtimber" when they were 9.0 inches or larger.

Key area and timber resource data for the two plans is listed and discussed in the following sections for comparison. Accomplishment under the old plan is covered in the sections following the comparison.

A. Comparison Data

Description	Previous Plan Inventory	This Plan Inventory
	M Acres	
Net National Forest Area	1853	1850 2/
Forested Reserved	47	68 2/
Forested Deferred	0	82 2/
Total Forested Area	1020	1048 2/
Forested Land suitable and available for timber management 1/	973	898 2/
Area in Spruce Fir Type	487	470
Area in Ponderosa Pine Type	54	30
Area in Douglas fir-white fir type	138	114
Area in White Pine Type	19	14
Area in Lodgepole Pine Type	36	19
Area in Aspen Type	239	251
Area in Sawtimber	564	470
Area in Poletimber	333	119
Area in Seedlings and Saplings	46	100
Area not adequately stocked	30	209 2/

1/ Includes Standard, Special, Marginal, and Unregulated Land Classifications.

2/ See Section "B Inventory Changes" on the following pages for further information.

Description	Previous Plan Inventory	This Plan Inventory
	M Cunits	
Volume in Growing Stock		
Softwood	14,903.23	13,705.73
Hardwood	2,095.45	2,094.89
Volume by Stand Size		
Sawtimber	13,894.19	12,722.94 1/
Poletimber	2,995.75	2,055.83
Seedling and Saplings	65.15	615.12
Inadequately Stocked	43.59	406.74
Net Annual Growth		
Softwood	111.14	177.86 1/
Hardwood	51.15	80.88
Annual Mortality		
Softwood	52.84	75.79
Hardwood	13.53	3.81
	M Board Feet	
Volume in Growing Stock		
Softwood	4,291,705	4,601,214
Hardwood	111,741	473,584
Volume by Stand Size		
Sawtimber	4,124,414	4,511,395
Poletimber	278,468	323,333
Seedling and Saplings	564	125,310
Inadequately Stocked	0	114,760
Net Annual Growth		
Softwood	32,914	53,626
Hardwood	2,163	3,508
Annual Mortality		
Softwood	18,826	25,564
Hardwood	1,388	519

B. Inventory Changes

1. Area

Changes in Net National Forest Area are a result of land acquisition and/or exchange along with recalculation of the acreage in portions of the Forest.

1/ See Section "B.2 Volume" on the following pages for further information.

The change in Forested Reserved reflects reclassification of the La Garita-Sheep Mountain Primitive Area into the smaller La Garita Wilderness in 1962 and the addition of the Weminuche Wilderness in 1975.

Forested Deferred is the forested portion of the New Study Areas.

The primary reason for changes in the Total Forested Land and Forested Land Suitable and Available for Timber Management is differences in inventory criteria and reclassification of land between Forested Reserved, Forested Deferred and that which is suitable and available.

The inadequately stocked stand classification increased significantly between the two inventories. Several factors contributed to the increase. Probably the greatest factor being a change in inventory criteria which resulted in identification and reclassification of approximately 52,000 acres of old burns and 81,000 acres of other regulated lands which are insufficiently stocked. Additionally, the new inventory includes approximately 67,000 acres of Aspen type needing additional stocking which was not identified in the previous inventory.

The previous inventory determined stocking by percent of crown closure. The new inventory based stocking on number of trees per acre in relation to number desired. The only portion of the inadequately stocked acreage resulting from cultural activities is approximately 9,000 acres of inadequately stocked clearcuts. The remaining area reflects reclassification of the same conditions on the ground that existed at the time of both inventories.

In summary, the 209 M acres inadequately stocked is comprised of the following areas:

	M Acres
Old Burns	52
Nonstocked Clearcuts	9
Reclassified Regulated Areas	81
Reclassified Unregulated Aspen	67

All but the 9 M acres of nonstocked clearcuts existed prior to both inventories but the criteria change in the new improved inventory identified the additional insufficiently stocked area.

2. Volume

The term "sawtimber" applies both to a tree size meeting certain diameter criteria and to a stand size in which half or more of the trees meet the criteria for the sawtimber tree. Likewise, the other stand size classifications (e.g. poletimber and seedling/saplings) are based on a majority of the stand meeting the tree size criteria for the particular tree size for which it is named but does not necessarily mean that all the trees are that size.

Since the trees in a stand are not necessarily all the same size, some scattered trees left from a previous overstory may be sawtimber size trees. Also, because of genetic differences some trees within a stand grow faster than others and therefore reach the sawtimber tree size criteria before the remainder of the stand. Because of these factors and inventory procedure, the trees meeting the criteria for sawtimber are inventoried and contribute to the total "sawtimber volume" regardless of the "stand size" in which they occur. Therefore, board foot volume occurs in the above tables in all stand sizes including seedling/saplings and inadequately stocked.

The lowering of the minimum sawtimber diameter from 11.0 to 9.0 inches between the two inventories increased the volume of sawtimber in both the seedling and sapling and inadequately stocked stand sizes. Much of this volume increase is relatively small diameter trees which are just growing into sawtimber size.

As discussed earlier, the area inadequately stocked increased due to changes in inventory criteria. Because of the additional area involved, the total volume of merchantable trees scattered over this acreage increased. Also, as described above some volume increase resulted from the reduction of the minimum sawlog diameter.

Growth increases can be attributed to cultural work such as thinning and release in those stands treated during the past 10 to 20 year period. Both commercial and non-commercial treatments are designed to leave the stand in a better condition for growth.

C. Area of Silvicultural Treatment

1. Reforestation

The reforestation goal for the previous planning period was 31,500 acres including 15,000 acres of type conversion, stagnated lodgepole pine and aspen with insufficient conifer understory. Accomplishment for the period was 6,614 acres. Priority for reforestation projects was given to non-stocked burned areas, like Osier Mountain, and inadequately stocked cutover areas.

Most of the above reforestation was accomplished through planting. Although direct seeding has been used, only 382 acres were successfully stocked. Its use is limited primarily to the ponderosa pine type.

2. Timber Stand Improvement

Timber stand improvement goals in the previous plan were stated in rather broad terms without a specific acreage goal. Thinning priority was directed toward overstocked young stands where site quality indicated good growth response. There were 6,304 acres thinned during the period. This was primarily in the Douglas Fir-white fir and spruce fir types. Both types have shown excellent diameter and height growth response from thinning. Diameter studies indicate individual tree growth increases of 50 to 100 percent are common.

Commercial thinnings were limited because of roundwood markets. However, there is an increasing demand for poles and other convertible products. For example, in Fiscal Year 1972, 675 cords of convertible products were sold and cut from poletimber size stands.

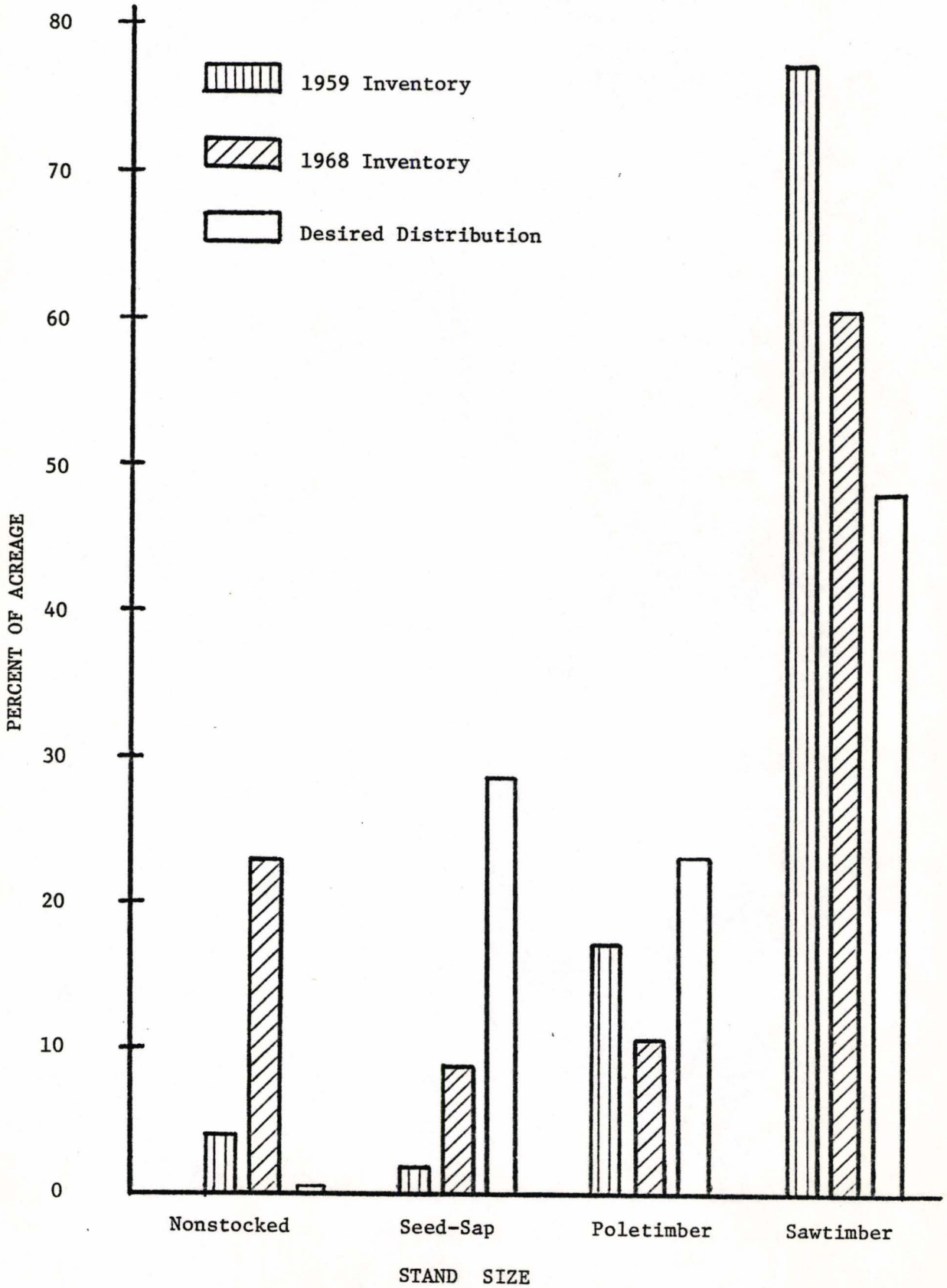
D. Progress Toward Regulation

Progress toward regulation was confined to a reduction in the area stocked with sawtimber and an increase in the area stocked with seedlings and saplings. The following table and bar graph depict the percentage of area by stand size at the time of the 1959 and 1968 inventories. The desired distribution is that of a fully regulated forest and is also shown.

Percent of Area by Stand Size

	Sawtimber	Poletimber	Seed/Sap	Nonstocked
	%	%	%	%
1959	77	17	2	4
1968	60	10	8	22
Desired	49	23	28	0

PROGRESS TOWARD REGULATION



IV. Management Objectives

A. Silvicultural Objectives

The Timber Management objectives are those that deal with the entire forest management situation and those that are associated with a particular timber type or type group.

All objectives are in conformance with or supplemental to those stated in the Framework for the Future and National Forest in a Quality Environment-Action Plan". The objectives are discussed below.

1. General Objectives

a. Maintain a sustained yield of timber products from the Standard and Special Components in harmony with the environment and other resource considerations. This is attainable within the guidelines of the Multiple Use Plan and this Timber Management Plan, assuming staffing and funding is maintained at suitable levels to do a silviculturally sound job.

b. Proceed toward attainment of the full potential yield which involves movement of 246,071 acres of Marginal land into the Standard or Special Components. Qualification for reclassification of the Marginal Component will require implementation of logging systems that can operate on steep slopes and erosive soils without undue damage to the site or other key values; and reforestation of all sites presently inadequately stocked to produce at their full potential.

The program expansion that will occur as a result of the shifting of Marginal lands will have a definite impact on the forest staffing and funding. Refer to the "Alternative Levels of Management" Section, item 3 for a description of the anticipated impacts.

c. Maintain an active salvage program designed to utilize mortality trees to the extent that it is economically feasible. Annual objective is the harvest of 5 million board feet of salvage material.

d. Work toward regulation of the Forest through equalization of age class distribution. Planned progress toward attainment of this goal is discussed in the regulation section.

e. Provide information to interested parties concerning the small roundwood material available in the Potential Yield for market development.

f. Reduce the need for artificial regeneration and accomplish reforestation of areas harvested within five years following final harvest. Accomplishment will be obtained, to the extent practicable, through approved silvicultural methods for each type. For example, use of the shelterwood system, which provides for the new stand prior to the harvest cut. Planting or seeding will be used where natural methods fail to establish the desired stocking within a reasonable time, or when genetically improved planting stock is available.

g. Examine more intensively using Stage II inventory procedures, those areas classed as "inadequately stocked" to determine need and suitability for reforestation. Prescribe needed site preparation and reforestation measures on a priority basis and reclassify areas not suitable or available for reforestation.

h. Prior to the expiration of this planning period, examine all regulated forest land and prescribe needed silvicultural treatments using Stage II inventory procedures.

i. Keep wildfire damage within objectives established in the Rio Grande National Forest Fire Plan. The objective is to hold annual area burned to 35 acres or less.

j. Include Fire Management considerations in all project plans developed to implement activities within the Timber system. The application of prescribed fire, fuel modification, and fuel reduction will be considered and included in the prescription for all silvicultural practices as stated in the Report of Close Timber Utilization, June 1972.

2. Timber Type Objectives

There are six primary timber types on the Forest. Description of the types and the silvicultural objectives, methods and procedures associated with management of each is presented below. Although terms and descriptions are in accordance with Terminology of Forest Science, Technology, Practice and Products and Forest Cover Types of North America, both published by the Society of American Foresters and Silvicultural Systems for Major Forest Types of the United States, published by the Division of Timber Management Research, USFS, a brief description of silvicultural systems will promote a better understanding of the management objectives.

Silvicultural systems are names applied to a particular type of forest cultivation and are somewhat descriptive of the cutting method used to regenerate the stand. The shelterwood, selection and clearcutting systems all have applicable use depending on the site conditions, silvical characteristics and objectives of the type being managed.

Each silvicultural system will be designed to accomplish management of tree species while maintaining or enhancing key values of wildlife, recreation and scenic quality associated with the various types and their silvical limitations. For example, the shelterwood silvicultural system is designed to maintain a forested aspect throughout the regeneration cycle. This provides for protection of the site from erosion, habitat protection for wildlife, production of forage, and reduction of impacts to the scenic qualities of the general landscape.

The shelterwood system involves removal of the mature stand in a series of cuts with the new stand developing under cover of a partial forest canopy. A final harvest cut removes the sheltering trees and permits the new trees to develop in the open as an even-aged stand. This system provides a continuing cover of either large or small trees. It is especially adapted to species or sites where shelter is needed for the new reproduction, or where the shelterwood gives the desired regeneration an advantage over undesired and/or competing vegetation.

The selection system includes the removal of mature and immature trees, either singly or in groups, at intervals. The assumption is that regeneration is established almost continuously. The objective is maintenance of an uneven-aged stand, with trees of different ages and sizes intermingled singly or in groups. The groups, however, may be even-aged. The system is esthetically pleasing, but is difficult to apply successfully unless the stand structure is favorable. Also, to be feasible, the timber species being managed must be able to develop under shade conditions. Management control is difficult when applied over large ownerships.

Clearcutting is the harvesting in one operation of all trees on an area for the purpose of creating a new even-aged stand. The area harvested may be a patch, stand or strip large enough to be mapped or recorded as a separate age class for area regulation. Applications on this Forest are limited primarily to the group or patch clearcut. Regeneration comes from natural seeding, sprouting of trees in the original stand, planting or direct seeding. This system requires careful location of boundaries to fit the landscape and appropriate slash treatment to improve the appearance of the harvested area.

a. Engelmann Spruce - Subalpine Fir

Either Engelmann spruce or subalpine fir is pure or predominant, or a mixture of the two may exist. Common associates occurring within the local type are Douglas Fir, white fir, and to a lesser degree, lodgepole and limber pine. Other species may occur in minor amounts.

The type is normally climax with very loose mixtures of Engelmann spruce and subalpine fir, but is frequently a pure stand of either of the above species. The type generally has a good unity of species and is definitely the uppermost timber type, lying above the interior Douglas Fir type and going to timberline on sheltered sites.

Following severe fires, the type tends to be replaced by lodgepole pine within its range or either aspen or grassy stages where no effort is made to regenerate tree cover.

The primary silvicultural system prescribed for this type is the three cut shelterwood. Following research guidelines contained in USDA-Forest Service Research Paper RM-110 Partial Cutting in Old-Growth Spruce Fir, by Robert Alexander. Basically, it is an even-aged system of management with regeneration obtained through three distinct cuts. The first partial cut removes from 15 to 40 percent of the overstory basal area depending on wind and blowdown potential. This is a preparatory cut to reduce mortality and establish wind firmness in the residual stand.

The second cut is made 10 to 20 years following the preparatory cut. It is designed to open the stand sufficiently to allow establishment of reproduction or improvement of reproduction already present under the stand. Up to 60 percent of the remaining basal area may be cut in this entry. The exact volume removed will depend on blowdown potential, degree of stocking in the understory, volume removed in the first entry, site conditions, degree of timber cover desired and related factors. The decision must be made on-the-ground after consideration of existing conditions and objectives.

The third and final cut in the regeneration sequence is to remove all the residual overstory, thus releasing the understory to grow as the new stand. This cut should not be made until the new stand is present. If it is not present, additional measures such as site preparation may be necessary.

Other management options may be necessary in special situations. For example, where extreme blowdown potential exists, such as exposed ridge tops, saddles in ridges, or upper south and west facing slopes where past blowdown is evident, the only alternative may be patch clearcuts or no cutting.

Intermediate cuts to reduce stocking to a level that will permit optimum growth may be applied anytime throughout the life of the stand. It may be either a commercial or non-commercial thinning, depending on availability of markets for products removed. The desirability of an intermediate cut is determined considering the cost of the project and the anticipated return based on site potential and length of time remaining before regeneration.

Another objective in spruce fir management is to keep spruce bark beetle activity below epidemic levels. Reduction of green slash and cull material left in the woods following logging through methods utilizing the full tree length followed by treatment or removal of remaining slash where feasible, is the most desirable preventative measure.

b. Interior Ponderosa Pine

Ponderosa pine is pure or predominant. Toward its upper limits, it may be associated with species requiring more moisture, such as white fir, Douglas Fir, limber pine, blue spruce and minor quantities of other species. At lower elevations it tends to occur immediately above the grass, sagebrush or pinyon-juniper zone.

The ponderosa pine type is usually a climax type and, if destroyed, will be replaced by subclimax plant communities which do not contain trees; i.e., grasslands, brush, or other shrubby types.

Natural regeneration in ponderosa pine is usually difficult to obtain regardless of the system used due to the failure of a good seed crop and adequate moisture conditions to occur the same year. Under ideal conditions, either of the silvicultural systems will adequately reproduce the type. However, due to the critical sites found on the Forest and the desirability of maintaining a forested aspect, the shelterwood or selection system will be the primary systems prescribed.

When volumes per acre are low, or site conditions extreme, something between the seed tree and shelterwood system may be used. For example, the initial regeneration cut may leave more trees than would normally be left for seed trees, but less volume than would be left following the preparatory cut in the shelterwood system. The key is to maintain protection of the site and thus provide a better opportunity for the new stand to develop and grow.

Group or patch clearcutting will be practiced in isolated instances where windthrow or disease infected stands necessitate. Where dwarf mistletoe infection is heavy, the clearcutting system followed by site preparation and planting, may be the only system feasible to protect the new stand.

Intermediate cuts may be applied throughout the rotation when the site potential, stocking and time left before regeneration of the stand is sufficient to permit adequate return on the investment.

c. White Pine

The white pines are valuable for esthetics and wildlife. With their short, stocky appearance accentuated by limbs frequently drooping or clothing the stem nearly to the ground, they present an esthetically pleasing appearance. The primary species (Bristlecone and Limber pine) are both very slow growing with maturity taking up to 300 years. There are records of individual trees far in excess of 400 years old. Seed crops are utilized by many wildlife species since the type occupies areas where other food supplies are scarce.

There is a relatively small area of the type on the Rio Grande (approximately 14,000 acres) occurring in isolated and frequently scattered, irregularly shaped stands on high, dry windswept sites. Because of the value of the type for esthetics, wildlife and the need to protect the critical sites they occupy, the white pine type is unregulated.

Cultural treatment or harvest will not be applied unless prescribed to benefit the above values and considerations. When any treatment is applied it will be in the form of individual tree selection.

d. Douglas fir-White fir

The type occurring locally more closely fits the description of "Interior Douglas Fir" but also has some small areas which contain pure stands of "White Fir". Since the Interior Douglas fir type predominates, description here will be limited to that species.

Douglas fir is predominant, or a mixture of Douglas Fir and White fir may exist. In the southern range the type is less perfect with white fir more common in mixtures with Douglas Fir or in small pure stands.

These timber stands are considered a well established climax type. They are replaced by aspen, lodgepole or in some cases, Douglas fir following fire.

Most of the species in the type germinate in the spring, mainly on moisture from snowmelt. The newly germinated seeds are normally exposed at once to the spring dry season, a most difficult time in the life cycle of the tree. Because of the above, the selection or patch clearcutting system, with planting of openings which do not restock naturally, are the preferred methods. This will protect the site while maintaining a general forested appearance.

Although clearcutting has the greatest immediate impact of the two systems, light volumes per acre and disease infected stands necessitate its use in certain areas. The impact can be minimized through variation of the size and shape of the clearcut patches. Individual clearcuts may range from 2 to 20 acres, depending on site conditions and forest management objectives.

Intermediate cuts in this type offer a good opportunity for commercial Christmas tree harvest. Where natural reproduction is too thick to allow adequate development of Christmas trees, a precommercial thinning to permit Christmas tree development should be made. The number of stems left should be sufficient for both an intermediate Christmas tree harvest and the final crop of sawtimber.

e. Lodgepole Pine

In this type, Lodgepole pine is pure or predominant. There may, however, be minor amounts of a wide variety of other species. The key species has a broad range of temperature and moisture tolerances and while it characteristically occurs at middle elevations, it may tend to replace Ponderosa pine in the lower elevations and usually runs well into the zone occupied by Engelmann spruce--subalpine fir type. Typically, it is a pure type and is frequently very dense.

Lodgepole pine is one of the most distinctive subclimax types of the West. Sometimes it is readily invaded and replaced by the climax conifers but more often appears as a well entrenched subclimax type in which replacement is proceeding slowly or apparently not at all. Thus, while generally regarded as subclimax it may behave like a climax type.

The primary silvicultural systems prescribed for the type are the shelterwood and clearcut depending on disease and insect problems. Specific cutting percents and individual stand prescriptions will be in accordance with research guidelines in USDA Forest Service Research Paper RM-92, Partial Cutting Practices in Old-Growth Lodgepole Pine, by Robert Alexander.

As outlined in the above reference, cutting practices are related to vigor, disease infection, insect damage, wind risk and stand structure. With the relatively small acreage and the complexity of the alternatives, the individual treatments will not be presented in this text. Copies of the publications are available at the Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado.

f. Aspen

Quaking aspen is pure or predominant in this type. It is commonly nearly pure but may be associated locally with the ecologically similar alders, lodgepole or ponderosa pine, as well as understory species of subalpine fir, Engelmann spruce, Douglas fir, blue spruce, and other similar tolerant conifers.

The type is typically developed after burns and is distinctly subclimax. In Colorado, the type is widely developed and owing to the small number of coniferous seed trees and the aridity of the country, the rate of coniferous invasion is very slow. Consequently, aspen is virtually a permanent type reproducing itself vegetatively for repeated generations.

Several significant diseases and related conditions affect management of the type. White trunk rot and a variety of canker diseases and root rots contribute to severe losses. Most of the disease causing pathogens gain entry into the tree through wounds and root commutation contributing to blowdown or breakage.

Historically, the market for aspen has been for only token volumes of sawtimber and poles. Presently, several manufacturing firms are exploring possible uses of the species for a variety of goods utilizing various tree sizes.

Information has not been developed to clearly identify the various purposes for which aspen lands should be managed and the best cultural treatments to achieve those objectives.

When sufficient information is available, specific management directives will be formulated. For the present, the type has been classified as unregulated.

3. Timber Stand Improvement

Timber stand improvement will be primarily thinning and release of seedling-sapling and small poletimber stands. Guidelines are in Region 2 Supplements to Forest Service Manual 2470.

The following discussion of the practices is presented to point out major considerations necessary for proper stand management.

Because of progress in harvesting, more opportunities for stand improvement work exists. Opportunities for release through removal of cull trees overtopping young stands and thinning of young overstocked stands are abundant throughout the Forest.

Generally, thinning and release should be confined to dense stands of immature trees on the better sites. With special emphasis given to selection of the best possible leave tree available even though it may necessitate considerable variation in spacing. The total number of stems per acre should not vary widely from the objectives, however.

Dominance normally is given primary consideration. However, some types of dominance indicate wolfish tendencies, producing widespread crowns and heavy limbs. Although such trees may produce maximum growth, the quality produced is relatively low. In these instances, it is preferable to select the best co-dominants for leave trees.

Generally, the treatment objective is removal of trees that are unlikely to develop into merchantable stems, promotion of reproduction where inadequate and providing the desirable trees sufficient space to grow and fully utilize the site.

Pre-commercial thinnings are needed in dense second growth lodgepole pine stands to prevent stagnation. Pre-commercial treatment may also be possible in some stands already stagnated. Careful judgment is required in selecting stagnated stands so that unacceptable benefit cost relationships are avoided.

Highest priority should be given to those areas that have recently stagnated (within past 20 years) or are just reaching the point of stagnation. The objective is to reduce stand density to a level that diameter growth will proceed at a maximum rate until merchantable size is reached.

Consideration should be given to commercial thinning in Douglas fir-white fir stands for Christmas trees. Under some conditions of heavy stocking precommercial thinning to allow adequate space for Christmas tree development may be necessary. When this treatment is applied, adequate trees must be left to provide for both the Christmas tree crop and the final crop of sawtimber.

The following spacing guides are presented for broad direction in determination of proper spacing to achieve desired growth. Since spacing in a given stand must be related to site conditions, each cultural treatment project will be based on conditions and objectives for the particular stand.

ENGELMANN SPRUCE

DBH	TREES PER ACRE	SPACING (Feet)	BASAL AREA (Square Ft.)
2	681	8x8	14
3	681	8x8	34
4	681	8x8	59
5	538	9x9	73
6	436	10x10	85

PONDEROSA PINE AND DOUGLAS FIR-WHITE FIR

2	436	10x10	9
3	436	10x10	22
4	436	10x10	39
5	302	12x12	42
6	302	12x12	60
7	302	12x12	82

LODGEPOLE PINE

DBH	TREES PER ACRE	SPACING (Feet)	BASAL AREA (Square Ft.)
2	605	8x9	12
3	538	9x9	27
4	436	10x10	39
5	302	12x12	42
6	302	12x12	60

4. Reforestation

As pointed out in the objectives, natural regeneration will be obtained where possible. There are, however, areas of inadequately stocked forest land without adequate seed source to regenerate naturally. These are the areas requiring artificial reforestation. Current guidelines are in R2 Supplement to FSM 2470.

Most of the species on the Forest will regenerate naturally when the prescribed silviculture system is used. To meet the objective of reforestation within five years following harvest, stands will be examined during the fifth year following harvest to determine the degree of stocking. If needed, planting or direct seeding will be prescribed to assure full stocking.

Because of the critical site conditions and past experience with direct seeding failures, this method of reforestation has very limited application on the Forest. As further research improves knowledge and techniques to assure adequate success within reasonable cost ranges, use of direct seeding may increase.

Planting of stock grown in nurseries from seed collected within the Forest will be the primary artificial reforestation practice during this decade. Both hand and machine planting will be used depending on the species and suitability of the site. Because of cost considerations, machine planting is preferred where terrain and other factors permit. There are some sites, however, that cannot be planted except by hand.

A tree improvement program is being developed to produce genetically superior trees for future use. However, the time involved in developing, testing and growing of trees will delay their availability for several years. Pending availability of improved trees, seed collection will be controlled by zone and limited to pre-selected stands. However, when genetically superior tree seedlings are available, they will be used.

First priority will always be given to the better sites regardless of the species. Land previously forested, such as burns and areas harvested and not reforested within the five year limitation will be scheduled for compartment examination (Stage II Inventory). Priority for treatment will be ranked according to site quality. If for some reason such as loss of fertility caused by fire, an area does not meet the criteria for commercial forest land (capability to produce 20 cubic feet per acre per year) it will be reclassified.

5. Areas Requiring Specially Designed Silviculture

A stand of trees is a dynamic vegetative organization. Even in climax stands, changes can be brought on by insect, disease or other dramatic occurrences. Because they are dynamic, a policy of mere protection, rather than true management to maintain or enhance the coordinated resource objectives of the Travel and Water Influence Zones is not acceptable. Therefore, the silviculture objective within this plan is to manage the special component under guidelines and constraints contained in multiple use policy.

Planning the timber management practices including harvesting, timber stand improvement and reforestation measures, with due consideration for the esthetic impacts upon the landscape involves using one or a combination of all the silvicultural systems previously described in the plan. Consideration for shape, size, spacing, and timing of treatments, ecological concepts, the makeup of the area's soils, visual characteristics of the landscape, and objectives for each particular site are all involved in prescribing the treatment prior to any action that would alter its present characteristics.

Since the landscape management value is so intertwined with other resource considerations, and varies from situation to situation, rigid methods are obviously inadequate. An interdisciplinary analysis utilizing the skills of the silviculturist, wildlife biologist, hydrologist, soil scientist, landscape architect and engineer, as necessary, is essential to identifying the benefits and constraints required in these sensitive zones. Therefore, rather than prescribing a particular silvicultural system or systems for use in these zones, each area will be examined, and a prescription written for that particular area within these guidelines.

B. Regulation

Regulating a forest is designed to achieve three objectives. These are optimizing net growth, minimizing fluctuations in periodic yield and providing uniform distribution of area occupied by each age class. Full area regulation is one of the ultimate goals for managing the timber resource on the forest. It involves scheduling stand regeneration to eventually obtain an equal area of each age class producing at the desired potential for the selected intensity of management and rotation.

With the existing age class distribution and the necessity of furnishing a sustained even flow of raw material to the dependent market, final achievement of these objectives will take more than one rotation. As illustrated in the Progress Toward Regulation graph, present age class distribution has excessive area in mature and overmature trees, with less than desirable area in the younger age classes.

To continue toward regulation, commercial cutting will be primarily preparatory and overstory removal cutting in the mature and overmature age classes with priority on the overmature. This will reduce the area in older trees and increase the younger age classes as the newly regenerated stands are established. Cutting in older stands will also reduce mortality and increase net growth.

Reforestation of existing inadequately stocked areas is also high priority. This will get Forested land back into production and add to the acreage of younger age classes. Activities in the middle age groups (saplings, poletimber and young sawtimber stands) will be thinning and release to bring them closer to their full productive potential.

C. Yield

Potential yield is the maximum sustained yield level attainable through intensive forestry on the area suitable and available for Timber Management. Calculations consider the productivity of the land, conventional logging technology, and inter-relationship with other resource uses and the environment. Conventional logging technology and standard cultural treatments include all applicable developed and proven systems for intensive management whether or not they are currently economical or in general use locally. Products that are available, but do not have a known probability of local demand in the immediate future, are also included in the potential yield. Excluded are intensive activities that, at present, remain speculative or with unquantified benefit, such as genetics, fertilization, and irrigation. 1/

1/ FSM 2415.41 May 1972.

The potential yield is expressed for a ten year period.

The Programmed Allowable Harvest is the portion of the potential yield that is scheduled for sell in a specific year. It is influenced by market availability and based on funding, silvicultural practices, and multiple use considerations. The Programmed Allowable Harvest is primarily from the regulated area, but may include known yields from the unregulated forested land.

One objective of the Timber Management Program is to schedule a Programmed Allowable Harvest equal to the full potential yield for the Forest. Lack of market for the available material and inadequate use of proven logging systems, seem to be the greatest limiting factors to accomplishment. Forest efforts will be directed toward identifying and quantifying the material available for market development and alternative logging systems.

One of the immediate goals is to bring the Programmed Allowable Harvest up to the potential yield from the standard and special components. Attainment of this goal is dependent upon continuation of appropriations, manpower and market conditions during the next few years. Present goals are to reach this objective by 1977, then depending on the above variables, progress toward meeting the potential yield of the Standard, Special and Marginal Components throughout the planning period. The Standard and Special sell objective represents a decline of 3.4 MMBF from the average annual volume sold during the past five years (1969-1973).

Primarily, the reduction is a result of three factors; reclassification of 81,896 additional acres to Forested Deferred from the new study areas, reclassification of 61,846 acres to forested reserved from the new Weminuche Wilderness, and changing the primary silvicultural system from clearcutting in the previous plan to the shelterwood in the present plan.

V. Description of the Forest

A. Area and Location

The Rio Grande National Forest lies along the headwaters of the Rio Grande del Norte, "Great River of the North", and is one of the largest National Forests in Colorado. It is situated in the south central part of Colorado and has slightly over 1.96 million acres within its boundaries. It is located entirely on the easterly slope of the Continental Divide. Headwaters of all rivers and streams that flow into the rich agricultural lands of the San Luis Valley are on the Forest. Principal rivers from north to south are the Rio Grande, Alamosa and Conejos.

B. Land Use and Ownership

1. Patterns and Problems

Large holdings of non-federal land exist within the Forest boundary, mainly along major drainages and in the foothills. Most of the primary access roads are state or county jurisdiction. Secondary access to the timber sale areas have caused minor rights-of-way problems in specific instances. Good cooperation and relationships exist with most of the eight counties involved with the National Forest. Cooperative agreements for joint county-Forest Service road systems, fire control and law enforcement have been negotiated.

Private land within the Forest boundary is used for both fulltime and part-time residence. Ranching is the basic use by the fulltime residents with a lesser number of other types of business. Seasonal residency occurs both in the summer and winter depending on the particular interest of the individuals concerned. Summer activities center around fishing, hunting, hiking, etc., while winter occupancy is primarily connected with winter sports activities.

In addition to the above, there are over 80 summer homesites on National Forest Land occupied by paid permit from the Forest Service.

2. Ownership

The total area within the Rio Grande National Forest boundary is 1,961,455 acres, of which 111,410 are private or state owned. The National Forest system land is 1,850,045 acres.

C. Administration Responsibility

The Forest is divided into five Ranger Districts, with boundaries determined by administrative efficiency and general topography. The Districts have been further subdivided into 96 compartments, identified by prominent natural features and areas of similar management needs. A list of compartments by District is included in the appendix. The compartments are basic record keeping units and are used for logical areas for long and short term work planning purposes.

Administrative responsibility and other data for the various District subdivisions are as follows:

District and (Headquarters)	County	Total U.S. Ownership (M Acres)	Percent
Alamosa (Alamosa)	Alamosa Saguache Rio Grande Conejos Archuleta	244	13.2
Conejos (La Jara)	Conejos Archuleta	192	10.4
Creede (Creede)	Hinsdale San Juan Mineral	527	28.5
Del Norte (Del Norte)	Rio Grande Saguache Mineral	373	20.1
Saguache (Saguache)	Saguache	514	27.8

D. Forested Area

The Rio Grande National Forest contains 1,048,080 acres of forested land capable of producing at least 20 cubic feet per acre of industrial wood per year. This timber production land is further divided as follows:

Forested Reserved	68,346
Forested Deferred	81,896
Unregulated Forest	267,339
Regulated Forest	630,499
	1,048,080

Each of these classifications is further described and discussed in the following sections.

1. Forested Reserved

Portions of the Forest have been withdrawn from timber utilization under the Wilderness Act of September 1964. Forested land within these areas is in the "Forested Reserved" component of the land classification system for timber planning purposes. This area does not contribute to the Potential Yield or the Programmed Allowable Harvest. Data for the reserved areas on the Forest are in the following table.

Table 2

FORESTED RESERVED AREAS

Name	District	National Forest Area	Forested Area
La Garita	Saguache	22,458	6,500
Weminuche Wilderness	Creede	127,151	61,846
Total Area		149,609	68,346

2. Forested Deferred

This is forested land in areas administratively identified for study as possible addition to the Wilderness System or other withdrawal from timber utilization under authority contained in the Code of Federal Regulations.

The deferred classification is the forested portion of 230,191 acres included in the New Study areas discussed below.

An inventory of areas in excess of 5,000 acres which are substantially undeveloped and inaccessible by constructed roads was completed in June 1972. One objective of the inventory was to identify areas with wilderness value relative to other potential goods and services.

With the aid and advice of the public, areas were reviewed and evaluated for all possible uses, including potential wilderness. Following the review and evaluation, a final environmental statement on Roadless and Undeveloped Areas was prepared and filed by the Chief of the Forest Service with the President's Council on Environmental Quality in October 1973. The areas designated for further study on the Rio Grande National Forest are:

Name	Gross Area Acres	Forested Area acres
Chama S. San Juan	116,844	43,822
Sangre de Cristo	71,107	21,874
Snow Mesa		
Bristol Head	12,160	920
Zapata	30,080	15,280
Total	230,191	81,896

Of the total 230,191 acres in New Study area, there are 81,896 acres of forested land suitable for commercial timber production. This deferred land classification does not contribute to the potential yield and is not included in Programmed Allowable Harvest Computations.

3. Non-Selected Roadless and Undeveloped Areas

The Forest contains 332,903 acres of inventoried roadless areas that were not selected as New Study Areas or included in the Weminuche Wilderness. These areas contain forested land suitable for commercial timber production. The following table lists each area and shows the total area and the acreage of suitable forest land.

Table 3

Non-Selected Roadless and Undeveloped Areas

Name	Total Acres	Forested Land
Wheeler-Wason	73,880	28,074
Lake Fork of Saguache Ck.	5,338	4,597
Upper Rio Grande	4,025	2,728
Deep Creek-Decker Creek	83,140	62,534
Pole Mountain	52,825	13,735
Bristol Head	31,305	12,522
Bennett Peak	27,610	17,394
Willow Mountain	21,150	15,440
Fox Mountain	6,810	4,699
Saguache Creek	13,905	5,284
Sheep Creek	12,105	10,047
Total Area	332,903	177,054

Each area is included in the Forested Land base and yield computations. Future use of these areas will be determined through the Land Use Planning process and confirmed by Environmental Impact Study including filing of an Impact Statement prior to permitting any changes which would alter their potential for Wilderness Classification.

A unit area planning concept and approach is currently being used to assess wilderness qualities relative to other land and resource values for non-selected roadless areas and contiguous National Forest lands.

4. Regulated Forest

The regulated Forest land is that land that is suitable, available, and organized for timber production under sustained yield principles in coordination with other resource values. It includes the Standard, Specal and Marginal Components of the Standard Land Use Classification for timber management.

A sustained yield of products is dependent on a uniform distribution of size classes within each timber type. This Forest now has a preponderance of acreage in sawtimber stands with generally insufficient area of seedlings and saplings and poletimber. The imbalance is reflected in the following table showing area by type and stand size.

Table 4

Regulated Forest Land
By
Type and Stand Size
(Acres)

TYPE	SAWTIMBER	POLETIMBER	SEED/SAP	INADEQUATELY STOCKED	TOTAL
Spruce-Fir	299,654	46,129	36,447	85,623	467,853
Ponderosa Pine	0	0	0	30,266	30,266
Douglas Fir	68,216	19,575	0	26,025	113,816
Lodgepole Pine	6,724	73	11,767	0	18,564
Total Area	374,594	65,777	48,214	141,914	630,499
Percent	60%	10%	8%	22%	100%

The silvicultural needs for a stand of trees is dictated in part by the quality of the site as it relates to the tree species and its characteristics. Growing stock trees are those that meet quality standards for present or prospective use as timber products.

The number of growing stock trees 1 inch and larger per acre by type and size class are as follows:

Table 5

Regulated Forest Land

Number Growing Stock Trees
(Per Acre)

TYPE	SAWTIMBER	POLETIMBER	SEED/SAP
Spruce Fir	545	1211	1313
Ponderosa Pine	0	0	0
Douglas fir-white fir	804	1081	0
Lodgepole pine	712	0	1904

The basic raw material presently being utilized by the local forest product industry is sawlog size material with lesser volume of small products such as poles, post, etc.

To facilitate quantification of the volume of sawlog material available on the forest, specifications were set in the inventory defining tree size. Conifers 9.0 inches and larger were inventoried. Collectively, this material is called "sawtimber volume" regardless of the timber stand in which it occurs. For instance, some trees in the seedling, sapling and poletimber stand sizes are above the diameter criteria for these classifications. Therefore, some sawtimber volume appears in these stand sizes although there are insufficient trees to classify the entire stand "sawtimber". Other areas are inadequately stocked but have some partial stocking of scattered trees large enough to meet the sawtimber tree size standards. This volume is included in the "Inadequately stocked" classification.

The net sawtimber volume inventoried per acre and total volume on the forested area is shown in the tables below by species type and the stand size where the volume occurs.

Table 6

Regulated Forest Land

Net Sawtimber Volume Per Acre
(Board Feet)

TYPE	SAWTIMBER	POLETIMBER	SEED/SAPS	INADEQUATELY STOCKED
Spruce-fir	9,767	3,403	1,893	266
Ponderosa Pine				721
Douglas Fir-White Fir	5,018	1,391		1,479
Lodgepole Pine	2,234		1,394	
White Pine	13,581			
Aspen	3,714	1,639	646	407

Table 7

Forest Land Area
(Both Regulated and Unregulated)
Total Net Sawtimber Volume
(M Board Feet)

TYPE	SAWTIMBER	POLETIMBER	SEED/SAPS	INADEQUATELY STOCKED	TOTAL
Spruce-Fir	3,638,150	187,324	73,280	24,390	3,923,144
Ponderosa Pine				22,599	22,599
Douglas Fir-White Fir	349,553	29,638		39,871	419,062
White Pine	203,867				203,867
Lodgepole Pine	15,557		16,986		32,543
Aspen	304,269	106,371	35,044	27,900	473,584
Total	4,511,396	323,333	125,310	114,760	5,074,799

Volumes of individual species within a timber type are often valuable indicators of stand development and successional stage. A typical example is the spruce-fir type. Subalpine fir is a major component of the spruce-fir stand composition during the early life of the stand, but has a shorter maturity age than spruce; therefore, as the stands get older, the natural process is for the spruce to become dominant and eventually replace the fir.

The following table illustrates the composition found in spruce-fir sawtimber stands on the Forest. Notice the larger diameter trees are almost exclusively spruce.

Table 8

Volume Per Acre by Species

Spruce-Fir Sawtimber Stands
(Board Feet)

DIAMETER CLASS	SPRUCE	WHITE FIR	SUBALPINE FIR	OTHER SPECIES
10	1,144	12	221	4
12	1,450	16	191	36
14	1,517	16	105	26
16	1,191	8	90	4
18	906	9	214	58
20	839	0	20	0
22	1,061	0	0	0
26	481	0	0	0
30	82	0	0	0
33+	66	0	0	0
Total	8,737	61	841	128

The various silvicultural systems and harvesting sequences were discussed in the Management Objectives section of this Plan. However, some quantitative description of the acreage requiring special consideration in harvest techniques is desirable. Slopes over 40 percent are generally not suitable for ground skidding equipment. The following table shows the regulated Forest land occurring on slopes above and below 40 percent.

Table 9

Regulated Forest Land

Area by Slope Percent
(M Acres)

TYPE	0-40%	41+%	Total
Spruce Fir	389.1	78.7	467.8
Ponderosa Pine	30.3	0	30.3
Douglas Fir-White fir	92.8	21.0	113.8
Lodgepole Pine	14.9	3.7	18.6
Totals	527.1	103.4	630.5

16.4%

The travel and water influence zones also contain forest land which will require special consideration in logging techniques. The special component which contributes to the Programmed Allowable Harvest consists of 26,856 acres of spruce fir, 5,345 acres of Douglas fir-white fir and 1,181 acres of lodgepole pine types.

All timber operations in these zones will be governed by the needs and objectives developed for the individual site. Therefore, no attempt is made to give a broad prescription that will apply to all areas.

5. Unregulated Forest

This is Forest land that is suitable and available, but not organized for timber production under sustained yield principles; where timber harvest is permissible, but not a goal of management. The forested portion of developed recreation, administrative, summer home and public service sites are examples of unregulated forest and have a combined area of 3,410 acres.

In addition to the 3,410 acres above, there are 14,272 acres of white pine type and 249,657 acres of aspen type included in the unregulated forest land classification. The white pine is unregulated because of the value of the species for esthetics, wildlife, and the need to protect the critical sites where it grows. Information has not been developed to clearly identify the various purposes for which aspen lands should be managed and what the best cultural treatments are to achieve the objectives after the uses have been identified. Therefore, aspen land is included in the unregulated forest classification.

6. Accessibility and Transportation

The Forest is accessible by both rail and major highways. The Denver and Rio Grande Western Railway is a standard gauge rail system running from Antonito north to Alamosa then west to Creede. The scenic Cumbres-Toltec narrow gauge railroad runs from Antonito, Colorado to Chama, New Mexico. This line, however, normally does not haul freight.

Four major highways serve the Forest area. They are, U.S. Highway 160, Colorado State Highway 149, Colorado State Highway 17 and Colorado State Highway 114. Forest products are transported within and outside the Forest on all four highways and the standard gauge railroad mentioned above.

Over 2,300 miles of Forest roads built by the Forest Service, timber operators and others provide access within the Forest. Fifteen hundred (1500) miles are classed as primitive. By definition, these roads are not graded or drained. However, many of them are important travel routes suitable for passenger vehicles. There are 720 miles of graded and drained roads, 25 miles of gravel surfaced and 6 miles of paved roads that serve as internal arterial routes.

The transportation system is continually being changed. New roads are being constructed and selected old roads are being closed and rehabilitated. These activities are based on information contained in the Forest Transportation Plan which is available for review at the Forest Supervisor's Office, Rio Grande National Forest, Monte Vista, Colorado.

E. Multiple Use Management

1. Management Zones

These are delineated areas of land within forest planning units that have similar management situations, complexities, opportunities and objectives. Management decisions for the zones are developed within the direction and coordinating requirements prescribed in the Rocky Mountain Regional Multiple Use Guide and are based on thorough analysis and the management situation for each planning unit.

The management zones recognized are: The Crest, Intermediate, Foothills, Travel Influence, Water Influence and Special. They are further described under the section on Relationship to Timber Resource. (See appendix for vicinity map).

Area by Zone

Crest	200 M acres
Intermediate	1070 M acres
Foothills	114 M acres
Travel Influence	14 M acres
Water Influence	72 M acres
Special	380 M acres

A graphic illustration of the zone areas follows the Multiple Use Management Section (Circle Chart II).

2. Relationship to Timber Resource

Two of the multiple use zones do not include commercial forest land. These are the Crest and Foothill Zones. The Crest is characterized by rugged, barren peaks, rock slopes, plateaus, lakes, meadows and limited areas of alpine and subalpine tree species. The lower boundary of the Crest Zone is common to the upper edge of forest land which supports commercial timber. The Crest Zone is considered to be non-Forested land.

The Foothills Zone occupies the transition area between the plains and mountains. It typically lies along the base of the mountains below the Intermediate Zone. Vegetative types consist of open grassland, woodland or brush areas with scattered trees. The trees are usually of poor form and low productivity and are considered unmerchantable for wood products other than fence post and fuelwood. The upper edge of the zone is common to the lower boundary of the intermediate zone which supports the economical timber types. The Foothills Zone is unsuitable Forest land.

Another multiple use zone that is not managed for timber production is the Special Zone. This zone is established due to a particular condition of public interest such as a wilderness, wild, primitive, or natural areas, experimental forest, and unusual interest areas such as scenic, historic, geologic, and archeologic. This zone on the Rio Grande National Forest includes the La Garita Wilderness, Weminuche Wilderness, and the New Study Areas. The La Garita and Weminuche areas have a combined forested land area of 68,346 acres which is in the Forested Reserved Timber classification and the New Study Areas have a combined forested land area of 81,896 acres which constitutes the Forested Deferred Timber classification.

The remaining zones are those in which management direction provides a sustained yield of timber products correlated to protect and enhance other resource values. These are the Travel Influence, Water Influence and Intermediate Zones.

The Travel and Water Influence Zones include the designated road or stream together with varying widths of adjacent land area. Because of similarities in the use and management of these two zones, they have been grouped in the Timber Management Plan. There are 62,344 acres of commercial forest land in the zones divided between the Special (33,382 acres of suitable and available Forest land), Marginal (11,348 acres of steep slopes) and the Unregulated components (17,553 acres of aspen type).

The Intermediate Zone extends from the Crest Zone to the lower edge of the commercial timber growing area. It is a broad area in which soil, climate and topography lend themselves to the growth of trees. The Intermediate Zone includes the Standard and portions of the Marginal and Unregulated Components shown in the Standard Land Use Classification for Timber Management.

3. Planning Units

Direction for management of forest resources is contained in the Multiple Use Plan. Resource and activity management plans may prescribe long and short term management action for specific functions within these guidelines. To assure coordination of objective and values, all functional activity plans are developed within the constraints placed on uses and activities by the Multiple Use Plan.

Responsive to the National Environmental Policy Act of 1969, the planning and management policy and direction has been updated and merged with past practices developed through multiple use management into the Land Use Planning process.

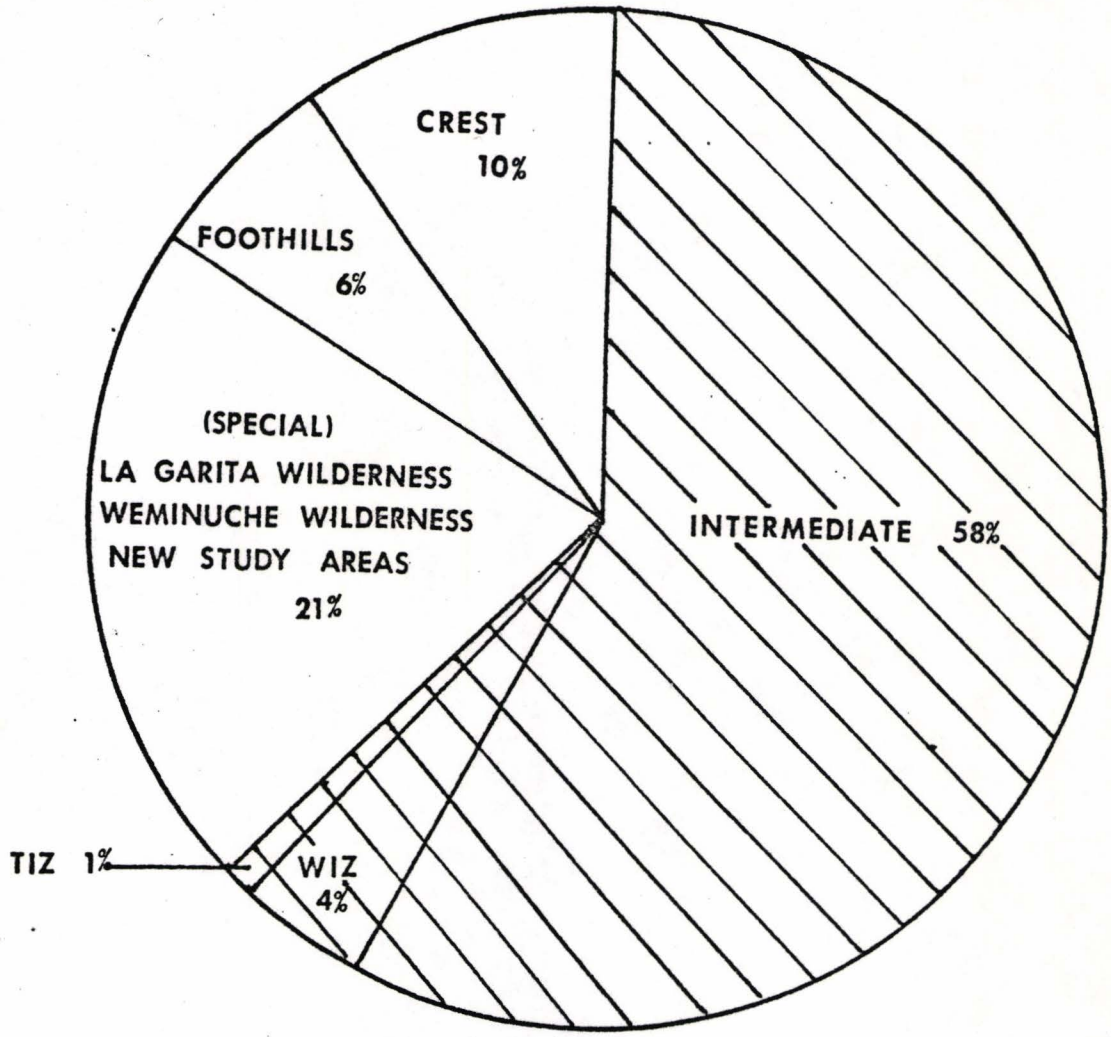
Through this process, plans that cover all aspects of management are developed for specifically identified and delineated land areas within the Forest. These land areas are called Planning Units. An aggregation of all the Unit Plans for the Forest, together with appropriate Regional and Area planning and guidance, make up the main components of the Forest Land Use Plan.

Six planning units have been identified and prioritized for data collection, narrative description, public involvement and environmental analysis and preparation of an Environmental Impact Statement. The first, South Fork Unit Area Plan, is scheduled to be completed in Calendar Year 1975.

As each unit area plan is completed and implemented, the Timber Management Plan will be appropriately revised.

RIO GRANDE NATIONAL FOREST

Multiple Use Management Zones



SUMMARY

Zone	M Acres	Percent
Intermediate	1,070*	58
Water Influence	72*	4
Travel Influence	14*	1
(Special)	330	21
Foothills	114	6
Crest	200	10
TOTAL	1,850	100

*Acreage within which the forested areas are subject to TIMBER MANAGEMENT PLAN activities.

CIRCLE CHART II

VI. Forest Conditions and Management Situation

The management options are limited by the conditions that exist on the ground. The condition of the Timber resource on the forest can best be described in terms of degree of stocking, site capability and its relationship to yield potential, and risk of volume loss through decay and mortality. Each are discussed in the following sections along with an analysis of mature, immature, stagnated and inadequately stocked stands.

A complete listing of Condition Class, Site Index, Yield Class and Risk Class area data by type is included in the appendix for further study.

A. Stand Condition Class

This is a system of classification based on the current condition of stands in the regulated forest land expressed in terms of desirable tree stocking and other considerations affecting the establishment and development of the stand.

Stand condition information indicates that only 12 percent of the commercial Forest land area is more than 60 percent stocked with desirable trees. Another 58 percent is 60 percent or better stocked considering both desirable and acceptable growing stocked trees.

The final 30 percent of the area is less than 60 percent stocked. These areas usually require regeneration to realize full productive potential of the site.

B. Site Index

Site index is a measure of the capability of the land to grow trees. Specifically, it is based on the height a dominant tree grows in a specified period of time. Normally it is based on a 50 or 100 year period, but other periods are sometimes used depending on the individual species and the expected growth rates.

In this plan, the index for spruce fir, Douglas fir-white fir, lodgepole pine and ponderosa pine are all based on a 50 year period. For simplification and comparative purposes, an index of 10-29 is considered poor site; 30-49 fair site; and 50 and above good site. This is a relative comparison based on local conditions and does not necessarily hold true for other areas or Forests.

Percent of regulated forest area by site quality is as follows:

Poor Site	(Percent) Fair---Site	Good Site
33	66	1

C. Yield Classes

This is a grouping of the regulated forest area based on the capability of the land to grow wood. It is expressed in cubic feet of growth potential per acre annually. A yield index in the range of 0-19 is considered unsuitable, 20-49 fair and 50-84 is good.

Percent of regulated forest area by yield potential is as follows:

YIELD INDEX/CUBIC YIELD POTENTIAL		(Percent)
0-19	20 - 49	50 - 84
0	55 1/	45

1/ On 2 percent of this area, site trees to adequately measure site index were not available. Other analysis indicated that these sites met minimum productivity requirements.

D. Risk Class

This is a classification based on the percent of trees with high risk characteristics indicating strong possibility of loss through decay or mortality. The classification is applied to the area in sawtimber stand size only, since this is the older, more risk prone timber classification.

The higher the risk class percentage, the more trees within the stand that have high risk characteristics. Therefore probability of loss also increases. Some of the factors used to evaluate individual trees in risk determination are:

- 20% or more rot in merchantable portion of tree
- Signs of serious damage or pathogen
- Crown ratios of 20% or less for ponderosa pine and 30% or less for other conifers

The percent of sawtimber stand area by risk class is shown in the following tabulation. The column headings indicate the percent of trees having low risk characteristics and the number under the column heading is the percent of sawtimber stand area meeting the criteria.

0-25%	25-50%	50-75%	75-100%	Insufficient stocking to determine a class
9%	20%	38%	22%	11%

E. Mature and Overmature Stands

These are stands where the age has reached or exceeded the prescribed rotation. There are 374,594 acres of mature and overmature timber in the regulated forest area comprising about 60 percent of the total regulated acreage. The area by type and maturity is:

Type	Mature (M Acres)	Overmature (M Acres)
Spruce fir	50.0	249.6
*Ponderosa Pine	0	0
Douglas Fir-White Fir	6.8	61.4
Lodgepole Pine	0	6.7

*Insufficient inventory data upon which to base classification.

With the high percentage of overmature timber, priority for regeneration should be in these stands unless other conditions such as access, disease, insects and similar factors make it impractical. About 35 percent have a manageable understory and should be harvested on a higher priority than those areas without understories.

F. Immature Stands

1. Overstocked

A stand is immature until it reaches the prescribed rotation age. There are 48,214 acres of seedling and saplings and 65,788 acres of poletimber included in the immature classification on the Rio Grande National Forest. Because of their general ability to respond to cultural treatments and the length of time remaining before maturity, immature stands are high priority for thinning and release work. The poletimber stands average over 1200 trees per acre and the seedling and saplings over 1300, indicating the need for stocking control.

The area of immature timber by type and stand size in the regulated forest area is:

Type	Seed/Saplings (M Acres)	Poletimber (M Acres)
Spruce fir	36.4	46.1
Douglas fir-white fir	0	19.6
Lodgepole Pine	11.8	0

2. Inadequately Stocked Stands

Areas are considered inadequately stocked if the area is suitable and available to grow trees but is not stocked with 300 or more healthy, well distributed trees per acre. There are 141,903 acres of regulated Forest land classified as inadequately stocked.

According to an analysis of the inventory sample locations that were inadequately stocked, only 50,643 acres have no acceptable stocking. These are primarily old burned areas and areas in the process of regeneration following clearcutting that had not reforested at inventory time.

The remaining 91,260 acres are partially stocked with acceptable trees ranging from 30 to 270 trees per acre. Approximately 18% or 24,700 acres have 200 or more acceptable trees per acre. These areas can be fully stocked by interplanting.

As implied above, there may be acreage in the inadequately stocked classification due to prior cutting at inventory time that have since restocked. Other areas may not be suitable sites for producing timber; therefore, should be reclassified. For example, rocky ridge tops and other areas near timberline at both high elevations and in the foothills zone.

During Stage II inventory, all nonstocked areas will be examined closely to determine the proper classification and prescription. Reforestation planning and priorities will be based on these intensive surveys.

3. Stagnated Stands

These are stands in which growth has been minimized due to extremely close spacing. Growth response following thinning is marginal and uneconomical.

The only stagnated stands on the Forest occur in the lodgepole pine type which occupies less than 1 percent of the regulated forest area. Although the inventory does not identify the exact acreage, it is estimated that there are 11,800 acres in this condition. During Stage II inventory, these stands will be identified and the proper treatment prescribed by priority.

Dwarf mistletoe free stands that are stagnated can be thinned where the stand age does not exceed 60 years. Infected stands and/or those older than 60 years should be regenerated, if they are stagnated.

Other types have stands with minimal growth conditions indicating the need for thinning; but these stands generally will start growth following thinning, therefore do not meet the true definition of stagnation.

VII. Regulation

A. Rotations

All of the regulated forest is capable of producing timber crops of sawtimber size and quality in a reasonable time. Therefore, a standard sawtimber rotation is assigned for each major type. Specific rotations were determined based on the period of time required for the tree of average basal area on the average site to reach a given diameter.

Other factors considered in the rotation determination were growth rates, pathological age, timber stand improvement practices and both known and anticipated market needs. Consideration was also given to the fact that approximately half the area in each type will produce a crop at or above the average size objective.

Rotations and diameter objectives are shown by type in the following table.

Rotations

Type	Rotation Age	Diameter Objective
Spruce Fir	140	18" dbh
Ponderosa Pine	120	16" "
Douglas Fir	120	16" "
Lodgepole Pine	100	10" "

B. Growth and Mortality

Detailed growth and mortality data was obtained through comparison of 65 twin fixed radius plots established in the 1959 inventory by the Intermountain Forest Survey Unit and remeasured by Rio Grande Forest personnel in 1968.

To strengthen the sample, additional data was collected on 125 new 10 point cluster plot locations established during the 1968 inventory. The plans and specifications for both inventories are on file in the Forest Supervisor's Office, Rio Grande National Forest, Monte Vista, Colorado.

1. Growth

Total net annual growth on the regulated forest land is 57.1 million board feet annually. The accelerated growth is attributed to additional acreage placed under management through cultural treatments such as precommercial thinnings and release (6,304 acres treated) and commercial thinnings through harvest of poletimber and sawtimber. The trees left following treatment are the better individuals in the stand. This, combined with the additional space provided by thinning, results in a faster growth rate.

Additionally, about 7,000 acres were reforested during the period, which put land into production that formerly was non-forested or in slow growth, overmature stands. The growth trend should continue upward during this planning period as more stands are thinned both by timber stand improvement practices and commercial harvesting of the older, slower growing mature trees.

As pointed out in the comparison section, stand size classification is based on the prevailing condition within the stand. Although a stand may not have adequate stocking to meet the criteria for a sawtimber or poletimber size class, it may have scattered trees of these sizes. Therefore, growth and mortality occurs and is recorded in the "non-stocked" and "seedling and sapling" stands. This is reflected in the graphs following this section depicting net growth in cubic and board feet.

2. Mortality

Mortality is the volume of wood lost through death of growing stock trees throughout the area considered suitable and available for timber production. Therefore, it is not practical or considered feasible to recover all mortality that occurs on an area the size of the Rio Grande National Forest. However, where feasible, salvage is one of the prime objectives of management to reduce the loss to an absolute minimum.

Annual mortality in coniferous types between 1959 and 1968 was 26.1 million board feet. The bar graphs, following this section, illustrate mortality as it occurred.

C. Calculation of Yield

Yield in terms of forest products that the Forest is capable of producing on a sustained basis is calculated and expressed two ways. "Potential Yield" is the optimum harvest level that the timber resource could produce with intensive forestry on the regulated forest land area. The Potential Yield rationale and considerations are discussed in Section VIII of the plan.

Merchantability specifications used in the yield calculations are sawtimber trees 9.0 inches dbh and larger to a variable top (approximately 6 inches dbh). Roundwood is considered to be all trees 5.0 inches to 8.9 inches dbh and those not merchantable for sawtimber because of defect but containing merchantable roundwood.

The "Programmed Allowable Harvest" is the portion of the Potential Yield that is scheduled for harvest in a specific year considering funding and market conditions. The following discussions are primarily directed toward the Potential Yield from the Standard and Special Components. However, since that is part of the full potential from all components, certain items will be applicable to the Potential Yield from the Standard, Special and Marginal Components.

Figuring the yield, involves various long and tedious mathematical calculations to determine the proper mix of the variables involved that will produce the optimum sustained yield. Until recently, these calculations were made by hand. The Pacific Southwest Forest and Range Experiment Station of the U.S. Forest Service, developed a simulation model using linear programming techniques that will make these and other calculations on a computer. The simulation model is called "Resource Allocation Model" or RAM for brevity. Yield figures used in this plan were computed using the simulation model.

For further reference on use and application of the computer system, the "Timber RAM Users' Manual, Part II: Foresters Guide," by Daniel I. Navon, was used in preparation of the various computer runs used in this plan. The Timber RAM computer programs and the Users' Manual are available on request to the Director, Pacific Southwest Forest and Range Experiment Station, P.O. Box 245, Berkeley, California 94701.

To use the simulation model, certain constraints or guidelines have to be set to keep the program within feasible parameters. These are discussed in the Potential Yield Rationale section of the plan.

The annual Programmed Allowable Harvest for the current year is included in the Summary section of the plan in statement form. It lists the annual acreage objectives by component and cutting method along with anticipated yield of sawtimber and products. The statement is revised annually to reflect changes that may occur from year to year.

Although the Programmed Allowable Harvest is expressed in terms of a one year program, the objective based on the potential yield of the Standard and Special Component is computed for a ten year period. The allowable harvest objective for the ten year period covered by this plan (Fiscal Years 1975-1984) is 231.37 million board feet. This does not necessarily mean that exactly 23.1 MMBF must be cut each year. The objective is to harvest the full 231.37 MMBF in the ten year period, recognizing there may be fluctuations in the annual programs.

1. Yield Components

Yield computations and projections are based on the area of suitable and available forest land that can be regulated for a sustained flow of forest products. To facilitate management of the timber resource in coordination with other key resource values and permit identification of various yield sources, the regulated forest land base is further categorized into yield components. These are the Standard, Special and Marginal depending upon the description and use of the land or timber occupying it.

a. Standard Component

The Standard Component contains the portion of the forested land that is to be managed with emphasis on optimized mixes of timber resource and all other uses, resources and activities coordinated to achieve realistic balances of output. The Standard Component contains 351,046 acres that are to be managed under sustained yield, even-aged timber management principles. This component is located in the Multiple-Use Intermediate Zone.

b. Special Component

The Special Component consists of the forested land in the Travel and Water Influence Zones excluding slopes exceeding 40 percent and extreme erosion problem areas. It contains 33,382 acres.

Management emphasis is for uses other than timber production. However, timber will be managed and harvested from this component on a sustained yield basis, subordinated to key values identified for each area. Harvest from the Special Component is part of the regulated cut and planned in the Programmed Allowable Harvest.

c. Marginal Component

The Marginal Component contains 246,071 acres and contributes to the potential yield.

Slopes exceeding 40 percent make up 103,354 acres of the Marginal Component. These are productive sites on slopes too steep to log with local conventional logging equipment and adequately protect other resource values.

351,046
33382
246071
630,499

Areas that are considered unstable because of soil erosion and mass instability, are included in this component. There are 6,814 acres of unstable area.

Also, included in this group are 135,903 acres of inadequately stocked forest land. Should funds and manpower become available to reforest part or all of this area, the reforested acreage will appropriately become part of the Standard or Special Component following reforestation.

Should new logging systems be developed or adapted for local use, the effected portion of the marginal land will be moved to the Standard or Special Component as appropriate.

2. Regeneration Cuts

Technically, regeneration cutting is "Any removal of trees intended to assist regeneration already present or to make regeneration possible". 1/ Therefore, all three cuts of the three-cut shelterwood system can be called regeneration cuts. However, at some point in the regeneration sequence, the age and classification of the old stand of trees being regenerated must be changed in the records to that of the young stand being established.

To facilitate record keeping, the regeneration entry that will change the stand classification under provisions of this plan, is the seed cut of the shelterwood system (second entry of a three-cut shelterwood) and any clearcut. When either of these cuts is made, the stand age and classification should be changed to reflect the new condition of the stand. Some mature stands have adequate reproduction already present in the understory. Where the overstory removal is made in two or more entries, the stand reclassification will occur following completion of the second cut. After a stand is reclassified, the acreage is included in the age class of the new stand for area control.

The area and yield of regeneration cutting that contributes to the Potential Yield from the Standard and Special Components is 79.9 M acres and 231.4 million board feet. Primarily, the activity is overstory removal in the Engelmann spruce-alpine fir type but includes a smaller area of clearcutting in the Douglas fir-white fir and Lodgepole pine types.

3. Intermediate Treatments

Any treatment applied to a stand to remove trees between the time of its establishment and initiation of the harvest cutting sequence is an intermediate treatment. Tree removal

1/ Terminology of Forest Service Technology Practice and Products, published by the Society of American Foresters.

can be either commercial or non-commercial depending on the availability of markets. Intermediate treatment planned during this decade is stocking control of 50,000 acres of seedling, saplings and poletimber to promote better growth. Anticipated yields from intermediate treatments is 502 board feet per acre per year for each acre accomplished the previous full fiscal year and will be harvested from the standard component up to a maximum of 50,000 acres during the decade.

In addition, there is an estimated 4 to 6 million board feet of salvage material available annually from dead and/or windthrown timber which can be utilized through an active small sale program. Utilization of this material involves logging small groups of trees in scattered locations.

4. Reforestation

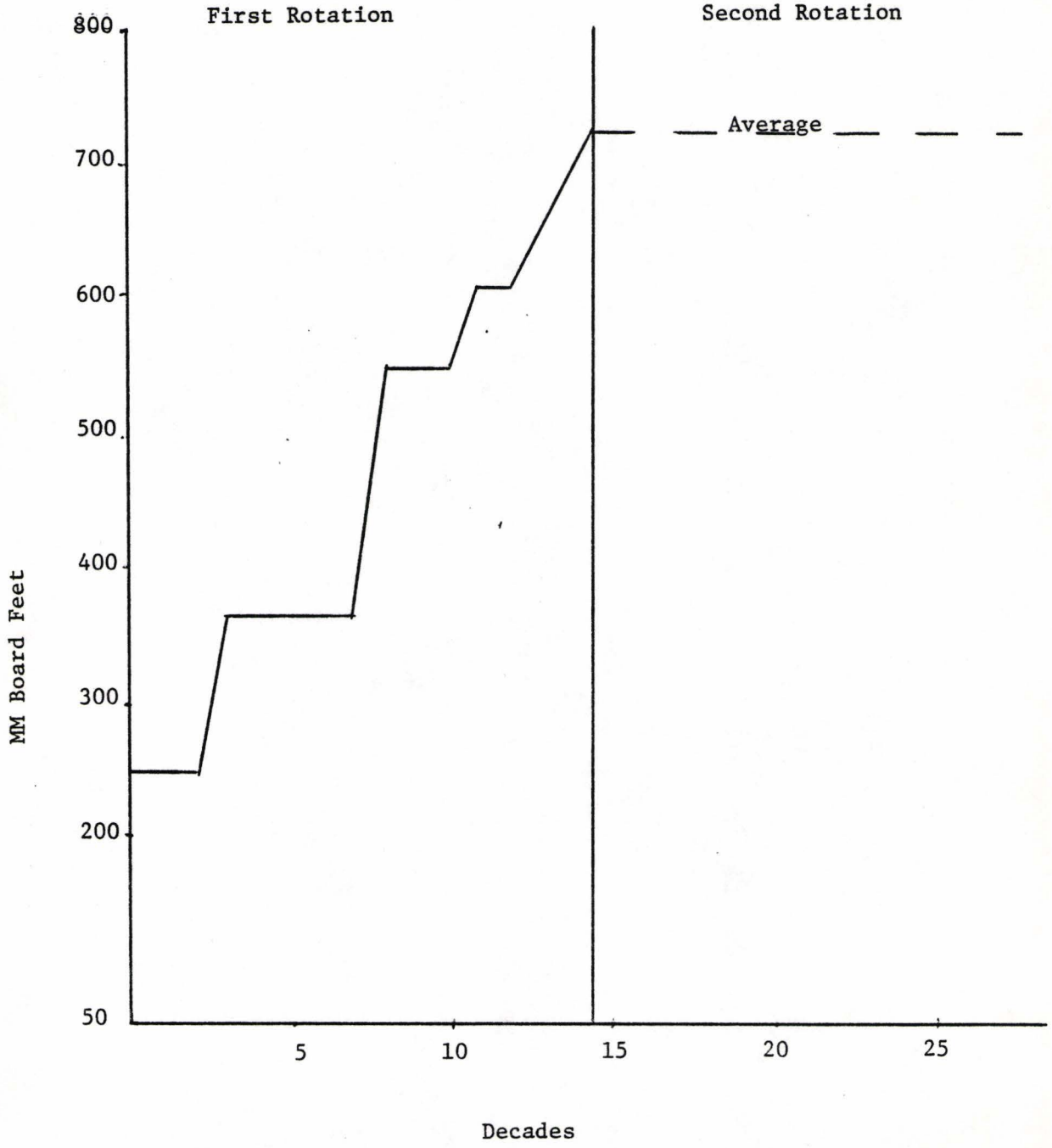
There are 6,000 acres of reforestation planned in the Standard Component. It is reforestation of understocked stands to maintain the current on-going reforestation program.

The following graph illustrates the predicted yield from the Standard and Special Components over the next 28 decades (two rotations) and indicates the feasibility of maintaining a sustained yield under practices prescribed in this plan.

A complete computer printout listing the input material used, computational data, and predicted yield for the same period of time is available for review at the Forest Supervisor's Office, Rio Grande National Forest, Monte Vista, Colorado.

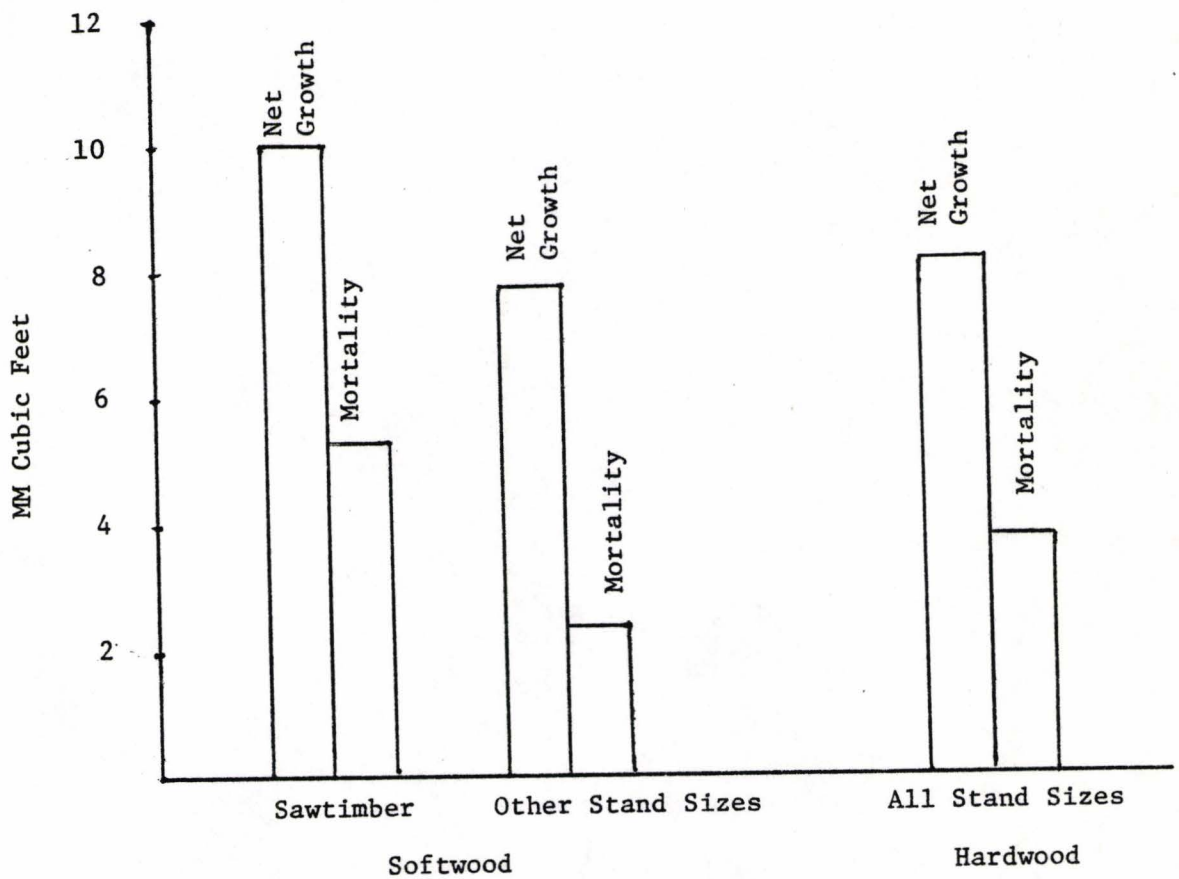
Potential Yield

Standard and Special Components

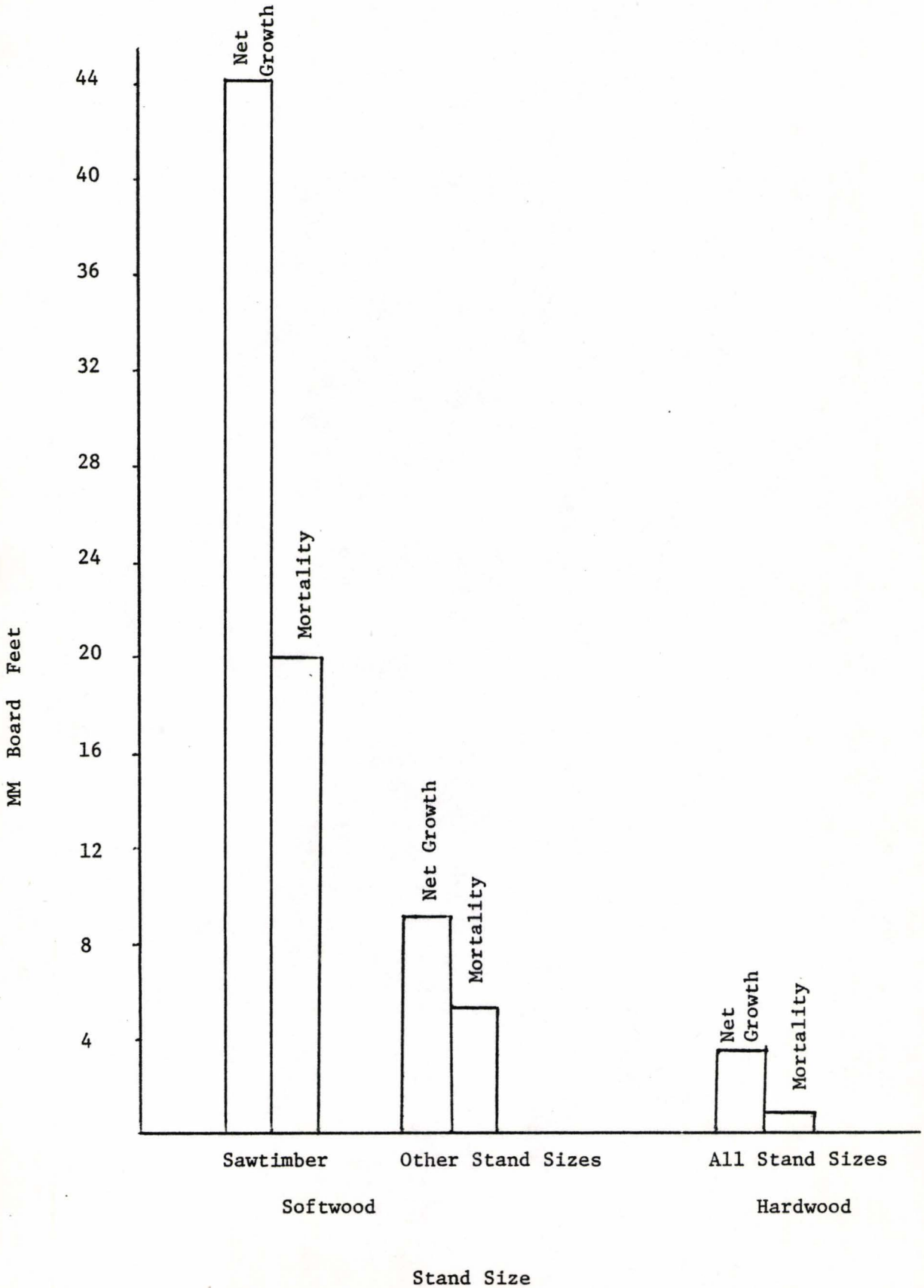


Source RAM Run C5E

Annual Cubic Growth and Mortality



Annual Boardfoot Growth and Mortality



VIII. Potential Yield Rationale

Potential Yield from the standard, special and marginal components is the optimum sustained production the timber resource can support under management. It will require cultural treatments, such as thinning and release of young stands, reforestation of all inadequately stocked areas, and adaptation of new logging systems and practices to log steep slopes and areas containing sensitive soils presently in the marginal component. Intensive Forest management also requires consistent adequate funding and staffing to sell and administer the additional volume over the present program.

The 1968 inventory data was projected forward to the mid point of the planning period through growth and mortality simulations. The potential yield statement reflects the projected yield and includes all species and products normally considered to be merchantable regardless of the local demand for them.

The Potential Yield area and volumes by type of cut for Fiscal Years 1975 through 1984 is in the Summary section of the Plan in statement form. Although the yield in the statement is for the next ten year period, the total planning horizon used was two rotations (280 years). The yield was calculated for the longer period to assure that levels achieved can be maintained. Also, to point out the increasing potential of the Forest through more intensive management leading to a fully regulated forest.

During computation of the Potential Yield, certain guidelines were used in the simulation model to keep the solution within acceptable parameters and to reflect policy and management direction. Significant assumptions based on ten year periods are as follows:

- Initial yield for the first decade should not exceed the lowest level that could be maintained indefinitely. It can increase, however.

  Yield throughout the first rotation cannot decline. Both these guidelines were established to maintain a sustained even-flow of products to the market in support of a balanced program in management of the Forest and stabilize area economics. Industry with large capital investments depend on a continuous level of operation to support their operations.

- The yield per decade in the second rotation could not vary more than 10 percent above or below the average for the rotation. This was also to stabilize the yield and attain regulation, but allow normal fluctuations associated with decade to decade changes in local demand, funding, manpower, and planning schedules.

- To maintain continuity between the two rotation periods, a stipulation was included requiring the last decade of the first rotation to be within one tenth of one percent of the average yield for the second rotation. This percentage was based on the fact that the present age class distribution imbalance must not create a wide variation between the two rotations.

- Alternative silvicultural systems and schedule options within each system were identified by species groups and the program was permitted to use various mixes of acres and combinations of systems and schedule options to meet the objective to optimize the yield over the first decade and achieve the long-term goals stated above. Available silvicultural alternatives included in the Resource Allocation Model computations are listed below by species group.

  Spruce-fir: Four options were available.
  Stands with adequate understories
  1. Shelterwood system with 10 year cycle.
  2. Shelterwood system with 20 year cycle.

  Stands without adequate existing understory
  1. Shelterwood system with 10 year cycle.
  2. Shelterwood system with 20 year cycle.

  Ponderosa Pine: Shelterwood system with a 10 year cycle.

  Douglas Fir-White Fir: Three options were available

  1. Clearcutting only.
  2. Shelterwood system with 10 year cycle.
  3. Shelterwood system with 20 year cycle.

  Lodgepole Pine: Clearcutting only.

- The only activity required to be accomplished during the first ten years was reforestation of 6,000 acres of the spruce-fir type.

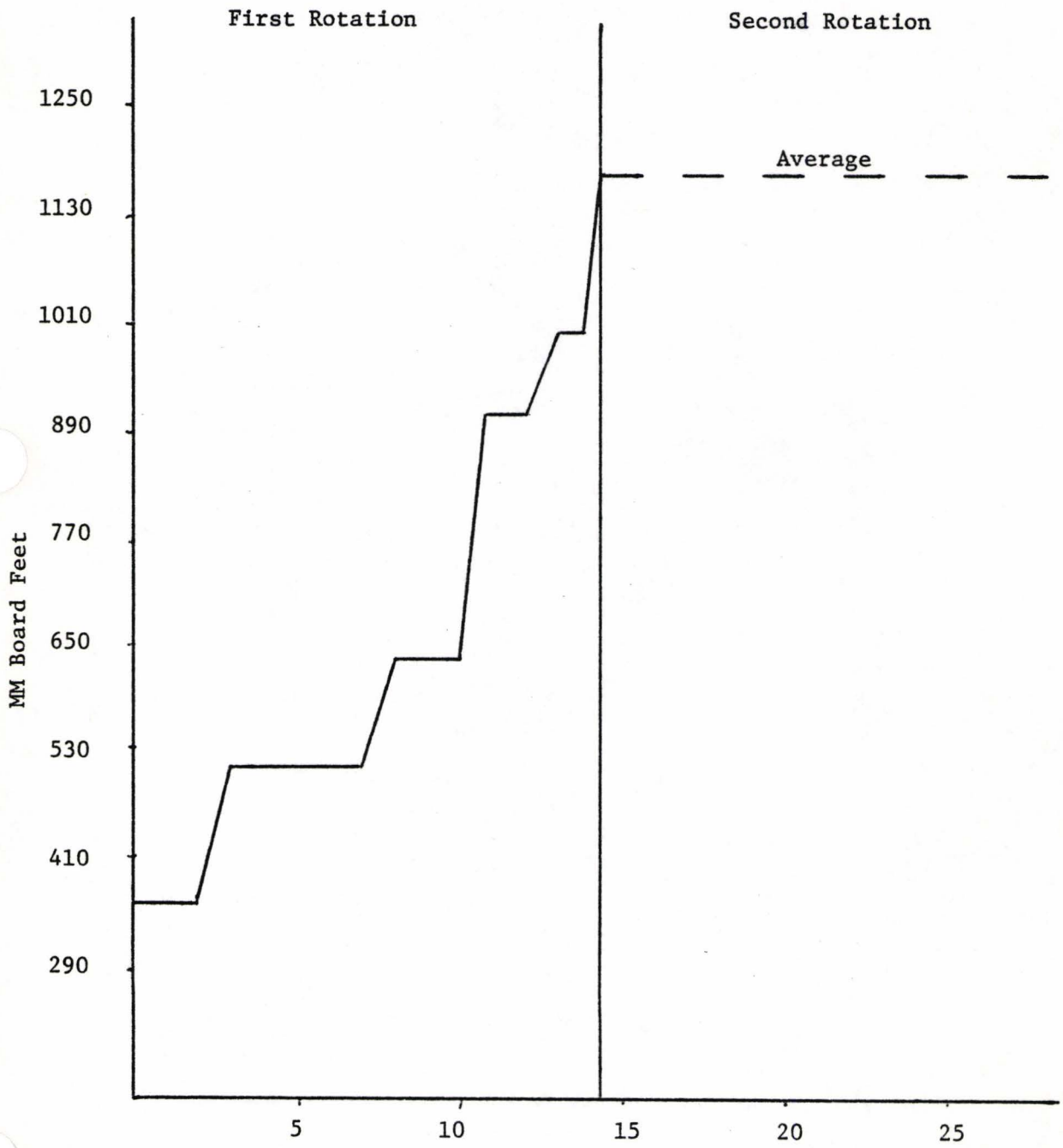
- Considering all of the guidelines, the objective was to optimize the yield over the first decade and achieve the long term goals.

The following graph illustrates the Potential Yield by decade through 280 years computed within the above program.

Complete copies of the computer printouts listing the input material used, computational data and yield is available for review at the Forest Supervisor's Office, Rio Grande National Forest, Monte Vista, Colorado.

Potential Yield

Standard, Special and Marginal Components



Source RAM Run B2E2

IX. Management Programs

A. Management Programs

1. Cutting Budget

a. Regeneration Harvests

Over 50 percent of the regulated forest land is in the mature and overmature age classes. Trees in these groups are the most susceptible to natural mortality and therefore must be considered the highest priority in scheduling stands for harvest. All areas harvested during the next ten years will be naturally or artificially regenerated.

The Five Year Timber Sale Action Plan schedules sales for reconnaissance, survey, sell and cut. The action plan covers five years but is revised annually to reflect changing conditions, priorities and levels of staffing and funding. A copy of the latest plan is on file at the Forest Supervisor's Office, Monte Vista, Colorado.

Specific sale area offerings have not been determined for the period beyond the current Five Year Timber Sale Action Plan, but the following table lists the targeted volumes to be sold by Ranger District for the last five years of the planning period.

Table 10

ESTIMATED SELL
BY
RANGER DISTRICT

Fiscal Year	Alamosa MMBF	Conejos MMBF	Creede MMBF	Del Norte MMBF	Saguache MMBF	Total MMBF
1980	2.0	3.5	4.0	9.8	4.0	23.3
1981	2.0	3.5	4.0	9.8	4.0	23.3
1982	2.0	3.5	4.0	9.8	4.0	23.3
1983	2.0	3.5	4.0	9.8	4.0	23.3
1984	2.0	3.5	4.0	9.8	4.0	23.3
Total	10.0	17.5	20.0	49.0	20.0	116.5

An additional 5 MMBF annually of salvage material is not assigned to any particular district pending location and feasibility of logging trees that die in the future.

b. Intermediate Harvests

There is no intermediate cutting scheduled this period. However, intermediate cutting will become more prevalent in the future as older-aged stands are replaced by young, thrifty stands.

c. Salvage Harvest

This is primarily cutting of dead and dying trees. Windthrown, insect and fire damaged trees comprise most of the salvageable timber. Salvage of usable trees or portions of trees through close utilization will be routine activity in regeneration and intermediate harvesting operations. It will also be a standard practice during road construction and other applicable national forest programs. These activities are expected to yield approximately five million board feet annually in salvageable material.

2. Timber Stand Improvement

Basically, the stand improvement opportunities existing on the Forest are limited to two primary stand situations. One is the young viable stands of poletimber and seedling/sapling size trees which are in need of release through thinning and removal of cull trees. The other situation involves stagnated stands of lodgepole pine needing release to prevent permanent stagnation or complete regeneration where permanent stagnation has already occcurred.

Approximately 9,400 acres of seedling and saplings are in need of release. These are primarily spruce-fir. Because of the age and size of these stands and the anticipated response of the species to release, this is high priority work. Within the stand size, priority will continue to be given to areas of young stands where site quality indicates the best growth response will result. Experience has shown that both Engelmann spruce and white fir will respond readily to thinning with accelerated growth.

In addition to the seedling/sapling stands, 38,300 acres of spruce-fir and 15,300 acres of Douglas fir-white fir poletimber needs release. This could be done commercially, but due to the large acreage, the volume of material available far exceeds the demand. However, commercial thinning operations will be encouraged through offerings of multi-product timber sales utilizing larger amounts of small round material. Since these stands have very little net growth at present and have the potential for growth acceleration following release, the work is very high priority with emphasis on commercial thinning commensurate with available markets.

There are an estimated 11,800 acres of lodgepole type that are stagnated. Stand size ranges from seedling/sapling to poletimber. Exact acreage by stand size is not available. Experimental thinning in these stands indicates they are too old to respond to release. These stands should be cleared and regenerated. However, no specific goal for conversion of these stands has been established because timber stand improvement in the 63,000 acres of spruce-fir and Douglas fir stands is considered higher priority.

Stand Improvement Accomplishment Goal

Forest Type	Commercial	Precommercial
Engelmann Spruce-Subalpine fir	25,300	9,400
Douglas fir-White fir	15,300	
Totals	40,600	9,400

Accomplishment of the timber stand improvement goal of 50,000 acres during the ensuing ten year period is dependent upon Congressional appropriation and Knutson-Vandenburg Act collections, manpower, and forest priorities. Also, extensive use of contracting will be required to accomplish the goal.

Anticipated increases in yield as a result of timber stand improvement were calculated using Yield Table in USDA Forest Service Research Paper RM-134 "Yield Tables for Managed Even-Aged Stands of Spruce-Fir in the Central Rocky Mountains" by Robert R. Alexander, Wayne D. Shepperd and Carleton B. Edminster. Increase due to these activities are earned at the rate of 502 board feet for each acre accomplished the previous full fiscal year and will be harvested from the Standard area. Increases may be earned up to a maximum of 50,000 acres.

3. Reforestation

The 1968 inventory indicates 142,075 acres of the regulated forest land area is insufficiently stocked with desirable or acceptable trees. About 60 percent or 90,000 acres of this is partially stocked ranging from 5 to 60 percent of desired stocking. The remainder of the area is either open or has trees occupying the site that do not meet the criteria for desirable or acceptable trees.

Source of the inadequately stocked acreage is from reclassification of old burned areas, insufficiently stocked clearcuts, and changes in inventory criteria which increased the acreage that qualifies for the inadequately stocked classifications. The estimated acres of each is as follows:

Source	M Acres
Old Burns	52
Nonstocked Clearcuts	9
Reclassified Areas	81
	142

From 1872 through 1952, there were approximately 133,000 acres burned in 18 major fires on the forest. Analysis of the 1968 inventory sample points indicates about 52,000 acres of the burned area is suitable for tree growth but not adequately stocked. The remaining 81,000 acres is reforested or no longer suitable or available for trees.

The total area clearcut on the Forest between 1962 and 1972 was about 19,000 acres. It is estimated that 9,000 acres of this was not adequately reforested and is high priority for artificial reforestation during this planning period.

As stated in the comparison section, there was a significant increase in the area classified as inadequately stocked because of a major change in the inventory criteria. The previous inventory determined stocking by percent of crown closure and the more recent inventory based stocking on number of trees per acre in relation to number desired. Therefore, approximately 81,000 acres was added to the inadequately stocked classification because of difference in criteria and not changes in ground conditions.

Examinations of the inadequately stocked acreage through Stage II inventory will be needed to determine current planting needs. Present day economics, priorities, and guides concerning type conversions will preclude the need for planting much of the old burned acreage. Adjustments in classification will be made as these areas are identified.

The planting goal for this plan period is 25,000 acres. Priority will be given to reforestation of inadequately stocked cutover areas. Little, if any, planting should be required in future harvest areas. Present cutting prescriptions provide for natural re-establishment of the Forest.

Reforestation Accomplishment Goal

Forest Type	Acreage	Percent	Priority
Engelmann spruce-Subalpine fir	23,400	94	1 & 2
Ponderosa Pine	800	3	3
Douglas fir-white fir	800	3	4
Totals	25,000	100	

The planting goal of 25,000 acres is a tenative objective established pending examination of the areas classified "inadequately stocked". Through Stage II inventory procedures, the entire inadequately stocked area will be examined more closely to determine suitability and need for reforestation. If the more intensive inventory indicates a need for adjustment of the tentative objective, the objective will be changed through amendment of this plan.

B. Forest Development

1. Rights-of-Way Needs

Priority for acquisition of needed rights-of-way are those directly affecting management of the timber resource. Access for timber sales, sale preparation, hauling and other timber practices are presently the highest priority for available rights-of-way funding.

The known rights-of-way needs directly affecting the Ten Year Timber Program are as follows:

Road Name	Number	Miles	Number of Landowners
Schrader	330	5.00	4
La Garita	670	4.00	4
Church Creek	356	.75	2
Osier	103	.70	4
South Carnero	675	1.10	1
Willow Mountain	238	2.00	State Owned
La Jara Creek	240	5.00	State Owned
Embargo	640	.25	1
Jacobs Hill	252	.50	1

2. Transportation Planning and Construction

The existing road network gradually evolved as the more easily available resources were developed with most of the Forest primary access routes confined by topographic features. Development of Forest Land Use and Transportation Plans over the next three years will identify the need for new roads and the reconstruction or elimination of existing roads.

Transportation planning, currently in progress, is an integral component of the land use planning procedure. Input from foresters, engineers, hydrologists, landscape architects, wildlife biologists and soil scientists is required in each land use and its related transportation decision.

Phase One of the Forest Transportation Plan was completed during 1974. It makes visible via base map, overlays, and recorded physical road characteristics the existing primary transportation network and a ten-year projection of resource uses. Subsequent phases of the transportation plan will quantify the relationship between all resource requirements and the transportation system in terms or projected traffic.

Transportation planning sub-units will be analyzed in combination with state and county roads to produce an overall Forest Transportation Plan to best meet resource management and environmental needs.

Transportation engineering principles will be applied to define need, location, and standard of facilities to support each land use alternative.

Under current harvesting techniques, construction of roads is necessary to facilitate attainment of the potential yield. Contractors construct many of the roads necessary under terms of the timber sale contract and allowances are deducted from the selling price of the timber to cover the costs incurred by the contractor in constructing the roads. Congressionally appropriated funds to the extent available (FR&T) are used to purchase surfacing material and culverts for drainage.

The following table lists those roads which are in place and on the existing Transportation System and those permanent roads which must be constructed in the next ten years to support proposed cultural activities.

Rio Grande National Forest Transportation System

Jurisdiction	Double-Lane (20 MPH +) Miles	Single-Lane (10 to 20 MPH) Miles	Single-Lane (1 to 10 MPH) Miles
Existing Roads			
Forest Service	19	681	1,127
State, County & Other	12	143	359
Subtotal	31	824	1,486

Proposed Additions

Forest Service	0	181	60
State, County & Other	0	0	0
Subtotal	0	181	60
Total System upon completion of ten-year period	31	1,005	1,546

An additional 450 miles of spur roads will be constructed during the ten-year period. These roads will serve only for the short-term use necessary for specific cultural activities. When no longer needed, they will be closed to normal vehicular use, scarified, adequately drained, and returned to production.

The above transportation system additions are necessary to achieve the current programmed allowable harvest objectives. Accomplishment will require approximately $870,000 of road money for construction and reconstruction annually. Any additional movement of marginal lands such as steep slopes into the standard or special components will require more road construction for adequate access to these areas. If the entire marginal component could be reclassified into the standard or special component, approximately 150 miles of additional road construction and reconstruction would be needed over the ten year period. It is estimated that an additional $750,000 annually in road funds would be required to properly manage the area as standard or special component.

C. Forest Protection

1. Fire

Recent fire history on the Forest has not been severe. Many of the old burns that account for much of the nonstocked acreage are the result of fires prior to permanent settlement of the San Luis Valley. However, evidence indicates that some of the larger fires occurred after settlement. Approximately 133,000 acres burned over after 1872. Much of the acreage is now grassland and supports little or no conifers. Aspen stands developed in other portions of the burned areas.

Fire occurrence and damage since the National Forest was established has been very low. Average number of fires for 1960-1969 was 18 fires per year. Most fires burned less than 10 acres. Lightning accounted for 48 percent of the fires, while 52 percent were man-caused. The objective established in the Forest Fire Plan is to hold annual acreage burned to 35 or less.

The principle fire problem in connection with timber harvesting comes from slash accumulation. A program of fuel reduction and/or modification will be incorporated in all silvicultural activities conducted under this plan. Added protection or needed slash treatment will be done to meet the fire prevention objectives of the Forest.

2. Insects

The Rio Grande National Forest has not lost any large quantities of timber due to insects. However, the potential for widespread epidemic populations exist if proper management programs are not conducted continually. The Engelmann Spruce Bark Beetle, Great Basin Tent Caterpillar, Spruce Budworm, and Mountain Pine Bark Beetle have reached localized epidemics in several cycles during past years.

a. Engelmann Spruce Bark Beetle (Dendroctonus rufipennis)

Small epidemic outbreaks developed in conjunction with timber sales and areas of windthrow in 1950. These have been controlled by logging, trap tree areas, burning, and chemical treatment of infested material. Future timber sales will provide for adequate spruce beetle control within accessible areas that are not deferred or reserved.

b. Great Basin Tent Caterpillar (Malacosoma spp.)

The tent caterpillars have infested various areas on the Forest for over 60 years. The most severe damage occurred on the southern portion of the Forest in the Conejos River drainage. The last major epidemic was in the late 50's and early 60's. Numerous acres of aspen were killed. Little effort to control or check the caterpillar was made.

There is a large resource of merchantable aspen in the Chama Basin on the southern edge of the Forest. Little, if any, caterpillar activity has occurred in the basin. However, aspen stands on private lands adjoining the Forest are heavily infested. Migration of caterpillars onto the Forest should be watched closely. Coordination with Colorado and New Mexico State Foresters is necessary.

c. Spruce Budworm (Choristoneora fumiferana)

Spruce Budworm activity in epidemic proportions began in 1945 in the Douglas fir-white fir types. Budworm spread throughout the South Fork area and the southern portion of the Forest. The insect caused damage to all age classes of the fir type. Experience has shown that overstory removal followed by TSI in the understory substantially reduces budworm. The thinned understory increases in vigor and health, and does not provide an acceptable habitat for budworm.

d. Mountain Pine Beetle (Dendroctonus ponderosae)

Populations of mountain pine beetle have reached epidemic proportions in several ponderosa pine areas in the past. Salvage logging and chemical treatment have prevented any large scale outbreaks from occurring. A winter logging program in the major portion of the pine type is keeping the pine beetle under control. Plans are to continue the winter logging program in this type.

3. Disease

Damages from rot cause the main volume losses from disease. The primary rots identified on the Forest are western red rot (Polyporus anceps) and white pocket rot (Fomes Pini). The amount of defect varies with site and stand age. Volume losses will decrease as the overmature timber is harvested and the timber stands steadily approach a fully regulated situation.

Dwarf mistletoe (Arceuthobium vaginatum) infection is heavy in some areas of the ponderosa pine type. Control measures through logging and timber stand improvement will be used in the infected stands.

Peridermium rusts are common in the spruce-fir stands. Indications are that infected trees are more susceptible to breakage and insect attacks. Cutting prescriptions will call for removal of infected trees before healthy trees.

White trunk rot and a variety of root rots contribute to severe losses in aspen stands. As stated in the Management Objectives for the type, most of the pathogens which cause these diseases gain entry into the tree through wounds and root commutation.

4. Animal Damage

Damage by porcupines is occurring in some areas of the ponderosa pine type. The porcupine population is relatively small and can be controlled on an area by area basis, if necessary. Rodents have caused some damage to plantations. However, to date, this damage has not been too severe. Plantations and areas of small trees should be watched for rodent damage. Appropriate control measures will be used, if damage becomes excessive. Big game sometimes browse the new growth on small trees in early summer. The overall effect of this has not been determined. Grazing by domestic livestock is excluded from plantations until the trees leader grows above browse height. This was determined to be an average height of five feet for the Osier Mountain Plantation where cattle will eventually use the area.

D. Alternative Levels of Management

The alternatives are associated with limitation because of steep slopes, erosive soils and backlog of areas needing reforestation. Each of these conditions is discussed below. Following the alternatives is a discussion of the estimated requirements in manpower and funding necessary to meet the additional programs should they be implemented.

1. Steep Slopes and Erosive Soils

Suitable and available forested land exceeding 40 percent slope is included in the steep slope classification. This is considered the approximate operational limit of logging systems presently being used. Ground skidding equipment on slopes exceeding 40 percent cannot be conducted without risk of damaging the other resources. Erosive soils are those that cannot be adequately protected with logging systems presently in use. Erosive soils are usually on steep slopes, but are not necessarily limited to the 40 percent break.

There are 103,354 acres of steep slopes and 6,814 acres of erosive areas that can be reclassified to the standard or special component when logging systems are available locally to log them.

If logging systems were available to feasibly harvest timber from these sites, the programmed allowable harvest could increase to 30.2 million board feet annually. This is a net increase of 6.9 million board feet (1.4 MM cubic feet). See last paragraph of 3 below for further information.

Logging of these areas will require a system or equipment that can lift the logs above ground level and transport them to a landing without dragging. Present systems, either developed or under development, that meet this requirement are the various skyline systems and those using airlift; e.g. helicopter and balloons.

2. Reforestation Backlog

The reforestation backlog is the acreage in the marginal component that is inadequately stocked but will not be reforested during the next ten years assuming continuation of the present level of operation. The backlog by type is as follows:

Type	M Acres
Spruce fir	80
Ponderosa Pine	30
Douglas Fir-White Fir	26
	136

There is an additional 6,000 acres of inadequately stocked Forest Land included in the Standard Component that is not considered "backlog".

Alternative levels of reforestation activity provide for earning increases in the yield at a rate of 62 board feet per acre per year for each acre reforested since the plan revision and will be harvested from the Standard Component. The increase in yield reflects the net effect on the potential yield and not growth response on a given acre.

Anticipated yields from the first 6,000 acres of reforestation are included in the yields from the standard and special components. 1/ Therefore, only increases in yield for reforestation activities in excess of 6,000 acres will be earned up to a maximum of 5,000 additional acres during the next ten year period.

If the entire backlog was reforested, the yield from the standard and special components for the next five decades would be as follows:

	Million Board Feet
Decade 1	284.2
Decade 2	283.9
Decade 3	392.1
Decade 4	391.7
Decade 5	391.3

Complete computer printouts with the input and computational data showing anticipated yields under all the above alternatives are available for review at the Forest Supervisor's Office, Rio Grande National Forest, Monte Vista, Colorado.

3. Impact of Additional Programs

The Rio Grande National Forest is presently staffed to handle an annual Programmed Allowable Sell of 23.3 million board feet at fiscal year 1974 funding levels. However, if the objective of achieving full potential yield is reached, the area classified as marginal must be shifted to the special and standard components. Any significant change in activity in the marginal area will require additional project funding and clerical and management personnel.

1/ See Potential Yield Statements in Summary Section of this Plan.

The following table lists the approximate number of additional personnel and salaries necessary to handle the impact of moving the entire marginal component into the standard and special component. The combined marginal areas consist of 246,071 acres with a combined predicted yield increase of 12.5 million board feet annually.

The combined yield increase of all the marginal area is different than the sum of the yields from each individual alternative because of certain yield benefits that can occur when a particular mixture of age classes is added to the forest land base to be regulated. When the area of a particular alternative is considered alone, a different mixture of age classes is involved compared to adding the entire marginal area. Therefore, full regulation may take longer thus effecting yield in the earlier decades. However, as full regulation is approached the volume differences no longer occur. Refer to the yield curve in the graph at the end of Section VII "Regulation". The continued increase in yield throughout most of the first rotation is a result of movement toward regulation and more intensive management.

Table 1
Expanded Program
Annual Requirements

Alternative	Clerical Manyears	Forester Manyears	Engineering Manyears	Total ManYears	Funds
Steep & Erosion	2.0	3.5	4.0	9.5	$198,000
Reforestation Backlog	0.5	1.5	0.5	2.5	$ 42,000
Totals	2.5	5.0	4.5	12.0	$250,000

The table only involves permanent full time personnel and their salaries. Other expenses such as travel, per diem, supplies and equipment are not included in the estimate.

Initiation of a major reforestation program to reduce the backlog of inadequately stocked areas will require an additional contracting specialist or a much larger seasonal work force to accomplish the larger program task.

X. Control Records

A. Control Section

The intent of this section of the Timber Management Plan is to provide the land manager with the allowable harvest parameters (i.e., controls) which must be followed in order to translate this plan into timber management actions on the ground.

The controls established herein are intended to assure that the plan is followed. They should be regarded as setting both targets to meet and limits not to be exceeded. This plan is based on three broad elements of control:

1. Species Working Group

2. Standard Land Use Classification for Timber Management within each working group.

3. Silvicultural treatments within each Land Use Classification.

Both volume and acreage goals are stated in this plan. Control is on an area basis with anticipated yields estimated. If conflict arises between volume and acreage goals, the area controls will prevail.

Volume will be expressed in control documents in both MBF and Cunits (one cunit = 100 cubic feet of firm wood). During the plan period, but not later than July 1, 1980, the cunit will become the standard unit of measure. The use of MBF as a unit of measure will eventually be discontinued. Control will be on the basis of area (and volume) sold rather than area (and volume) harvested.

Potential Yield figures are stated on a total plan period basis (10 years) and control is also based on the same period. It is anticipated that annual programs may fluctuate, above or below the annual expression of this decade control, but programs should be designed to meet the decade control objectives over the total plan period.

B. Details of Control by Working Group

1. Spruce-Fir Working Group

In addition to control of timber sold, this plan relates Programmed Harvest to the level of investment in reforestation in this working group. The potential yield of the Standard and Special components for the decade can only be achieved if 6,000 acres are successfully planted during the decade. At the end of five years actual accomplishment will be evaluated and potential yield recalculated on the basis of actual accomplishment.

After the 6,000 acres in the Standard Component are successfully regenerated, each acre present in the backlog that is successfully established by planting earns an increase of 62 board feet per acre per year. Increases from this activity will be harvested by shelterwood preparatory or overstory removal harvests in the Spruce-Fir working group in the Standard Component.

The yield for this working group in the Standard and Special Components is as follows:

	Shelterwood Preparatory		Shelterwood Overstory Removal	
	Area Acres	Volume MMBF	Area Acres	Volume MMBF
Standard	13,900	26.41	45,139	136.57
Special	4,000	9.20	2,000	6.20
Totals	17,900	35.61	47,139	142.77

Dead material salvaged is not chargeable against this yield. The approximate projected per acre yields from this working group in the Standard Component are 1.90 MBF for preparatory and 3.03 for overstory removal harvests. Therefore, for each 100 acres of the backlog successfully regenerated during the plan period, two to three acres may be scheduled for harvesting annually.

2. Lodgepole Pine Working Group

The yield for this working group is 4,290 acres (15.54 MMBF) in the Standard Component and 660 acres (2.11 MMBF) in the Special Component. All harvesting in this working group is by clearcutting. Trees smaller than 9.0" harvested and utilized are not chargeable against this yield. Dead material salvaged in or between cutting units is also non-chargeable.

3. Douglas fir-White fir Working Group

The yield for this working group is 9,900 acres (35.34 MMBF) in the Standard Component and none in the Special Component. All harvesting planned this decade is by clearcutting. Dead material salvaged is non-chargeable to the above yield.

Commercial thinning in this working group offers opportunities for increased yields. The stand improvement accomplishment goal for thinning is 15,300 acres in this working group for the ten year period. Yields are increased 502 board feet for each acre thinned the previous fiscal year. Increases may be harvested from the Spruce-fir, Douglas fir-white fir or Lodgepole pine Working Groups. Poletimber yields from commercial thinnings are not chargeable against the potential yield.

C. Records

The basic control record is the Timber Inventory Adjustment (TIA), Form 2400-25a. Instructions for use of this form are contained in FSM 2490.

Pending final testing and activation of the Timber Inventory Adjustment file in the Inform system, temporary file records must be maintained at the Forest level. The Rio Grande National Forest Timber Management Plan Control Form will be used for this purpose. When the TIA file is fully operational, this form will be maintained at the District level to record periodic goals and accomplishment.

Fiscal Year 75

Land Classification and Type of Treatment	Working Group Symbol	Total Planned 10 Yr. Period Acres	Total Planned 10 Yr. Period MMBF/M Cu.	Planned Accom. Area Acres	Planned Accom. Volume MMBF/M Cu.	Actual Accom. Area	Actual Accom. Volume MMBF/M Cu.
STANDARD							
1. Timber Harvest							
Clearcut	LPP	4,290	15.54/31.8				
	DF-WF	9,900	35.34/72.4				
Shelterwood							
Prepatory	S-F	13,900	26.41/54.1				
Overstory Removal	S-F	45,139	136.57/279.8				
Other							
2. Reforestation							
Plant	S-F	6,000					
Site Preparation							
Natural Regeneration	LPP	4,290					
	DF-WF	9,900					
Planting	S-F	6,000					
Natural Regeneration							
Prepared Sites	LPP	4,290					
	DF-WF	9,900					
Regeneration Survey	LPP	4,290					
	DF-WF	9,900					
	S-F	6,000					
Other							
3. Silvicultural							
Exam & Prescrip.	DF-WF	9,900					
	S-F	59,039					
Other							

Fiscal Year 76								Fiscal Year 77							
Planned Accom.		Actual Accom.		Cumulative				Planned Accom.		Actual Accom.		Cumulative			
Area	Volume	Area	Volume	Planned		Actual		Area	Volume	Area	Volume	Planned		Actual	
				Area	Volume	Area	Volume					Area	Volume	Area	Volume
	MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu		MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu

Fiscal Year 78								Fiscal Year 79							
Planned Accom.		Actual Accom.		Cumulative				Planned Accom.		Actual Accom.		Cumulative			
				Planned		Actual						Planned		Actual	
Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume
				Acres	MMBF/M Cu	Acres	MMBF/M Cu		MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu
	MMBF/M Cu														

Fiscal Year 80								Fiscal Year 81							
Planned Accom.		Actual Accom.		Cumulative				Planned Accom.		Actual Accom.		Cumulative			
Area	Volume	Area	Volume	Planned		Actual		Area	Volume	Area	Volume	Planned		Actual	
				Area	Volume	Area	Volume					Area	Volume	Area	Volume
	MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu		MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu

Fiscal Year 82								Fiscal Year 83							
Planned Accom.		Actual Accom.		Cumulative				Planned Accom.		Actual Accom.		Cumulative			
Area	Volume	Area	Volume	Planned		Actual		Area	Volume	Area	Volume	Planned		Actual	
				Area	Volume	Area	Volume					Area	Volume	Area	Volume
	MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu		MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu

Fiscal Year 84								Fiscal Year 85							
Planned Accom.		Actual Accom.		Cumulative				Planned Accom.		Actual Accom.		Cumulative			
Area	Volume	Area	Volume	Planned		Actual		Area	Volume	Area	Volume	Planned		Actual	
				Area	Volume	Area	Volume					Area	Volume	Area	Volume
	MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu		MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu

Fiscal Year 75

Land Classification and Type of Treatment	Working Group Symbol	Total Planned 10 Yr. Period Acres	Total Planned 10 Yr. Period MMBF/M Cu.	Planned Accom. Area Acres	Planned Accom. Volume MMBF/M Cu.	Actual Accom. Area	Actual Accom. Volume MMBF/M Cu.
SPECIAL							
1. Timber Harvest							
Clearcut	LPP	660	2.11/4.3				
Shelterwood							
Preparatory	SF	4,000	9.2/18.9				
Overstory Removal	SF	2,000	6.2/12.7				
Other							
2. Reforestation							
Site Preparation							
Natural Regeneration	LPP	660					
Natural Regeneration Prepared Sites	LPP	660					
Regeneration Survey	LPP	660					
Other							
3. Silviculture Exam & Prescription	LPP	660					
	SF	6,000					

Fiscal Year 76								Fiscal Year 77							
Planned Accom.		Actual Accom.		Cumulative				Planned Accom.		Actual Accom.		Cumulative			
Area	Volume	Area	Volume	Planned		Actual		Area	Volume	Area	Volume	Planned		Actual	
				Area	Volume	Area	Volume					Area	Volume	Area	Volume
	MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu		MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M C

Fiscal Year 78								Fiscal Year 79							
Planned Accom.		Actual Accom.		Cumulative				Planned Accom.		Actual Accom.		Cumulative			
Area	Volume	Area	Volume	Planned		Actual		Area	Volume	Area	Volume	Planned		Actual	
				Area	Volume	Area	Volume					Area	Volume	Area	Volume
	MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu		MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu

Fiscal Year 80								Fiscal Year 81							
Planned Accom.		Actual Accom.		Cumulative				Planned Accom.		Actual Accom.		Cumulative			
Area	Volume	Area	Volume	Planned		Actual		Area	Volume	Area	Volume	Planned		Actual	
				Area	Volume	Area	Volume					Area	Volume	Area	Volume
	MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu		MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M C

Fiscal Year 82								Fiscal Year 83							
Planned Accom.		Actual Accom.		Cumulative				Planned Accom.		Actual Accom.		Cumulative			
				Planned		Actual						Planned		Actual	
Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume
	MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu		MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu

Fiscal Year 84								Fiscal Year 85							
Planned Accom.		Actual Accom.		Cumulative				Planned Accom.		Actual Accom.		Cumulative			
Area	Volume	Area	Volume	Planned		Actual		Area	Volume	Area	Volume	Planned		Actual	
				Area	Volume	Area	Volume					Area	Volume	Area	Volume
	MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu		MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu

Fiscal Year 75

Land Classification and Type of Treatment	Working Group Symbol	Total Planned 10 Yr. Period Acres	Total Planned 10 Yr. Period MMBF/M Cu.	Planned Accom. Area Acres	Planned Accom. Volume MMBF/M Cu.	Actual Accom. Area	Actual Accom. Volume MMBF/M Cu.
MARGINAL							
1. Timber Harvest							
Clearcut	LPP & DF-WF	6,700	23.92/49.0				
Shelterwood							
Preparatory	SF	9,000	10.7/42.4				
Overstory Removal	SF	28,800	81.51/167.0				
Other							
2. Reforestation							
Plant	PP	800					
	DF-WF	800					
	SF	17,400					
Site Preparation							
Natural Regeneration	LPP & DF-WF	6,700					
Planting	PP	800					
	DF-WF	800					
	SF	17,400					
Natural Regeneration Prepared Sites	LPP	6,700					
Regeneration Survey	LPP, PP, DF-WF, SF	25,700					
Other							
3. Timber Stand Improv.							
Release & Weed	SF	25,300					
	DF-WF	15,300					
Precommercial Thin	SF	9,400					
TSI Surveys	SF & DF-WF	64,000					
4. Silviculture Exams & Prescription	LPP, DF-WF SF	6,700 37,800					

Fiscal Year 76								Fiscal Year 77							
Planned Accom.		Actual Accom.		Cumulative				Planned Accom.		Actual Accom.		Cumulative			
Area	Volume	Area	Volume	Planned		Actual		Area	Volume	Area	Volume	Planned		Actual	
				Area	Volume	Area	Volume					Area	Volume	Area	Volume
	MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu		MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M C

Fiscal Year 78								Fiscal Year 79							
Planned Accom.		Actual Accom.		Cumulative				Planned Accom.		Actual Accom.		Cumulative			
Area	Volume	Area	Volume	Planned		Actual		Area	Volume	Area	Volume	Planned		Actual	
				Area	Volume	Area	Volume					Area	Volume	Area	Volume
	MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu		MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu

Fiscal Year 80								Fiscal Year 81							
Planned Accom.		Actual Accom.		Cumulative				Planned Accom.		Actual Accom.		Cumulative			
Area	Volume	Area	Volume	Planned		Actual		Area	Volume	Area	Volume	Planned		Actual	
				Area	Volume	Area	Volume					Area	Volume	Area	Volume
	MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu		MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M C

Fiscal Year 82								Fiscal Year 83							
Planned Accom.		Actual Accom.		Cumulative				Planned Accom.		Actual Accom.		Cumulative			
				Planned		Actual						Planned		Actual	
Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume
	MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu		MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu

Fiscal Year 84								Fiscal Year 85							
Planned Accom.		Actual Accom.		Cumulative				Planned Accom.		Actual Accom.		Cumulative			
Area	Volume	Area	Volume	Planned		Actual		Area	Volume	Area	Volume	Planned		Actual	
				Area	Volume	Area	Volume					Area	Volume	Area	Volume
	MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu		MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu

Fiscal Year 75

Land Classification and Type of Treatment	Working Group Symbol	Total Planned 10 Yr. Period		Planned Accom.		Actual Accom.	
		Acres	MMBF/M Cu.	Area Acres	Volume MMBF/M Cu.	Area	Volume MMBF/M Cu.
UNREGULATED							
Overstory Removal							
Clearcut							
Salvage	LPP, PP, SF, DF-WF	---	50.0/102.0				

Fiscal Year 76								Fiscal Year 77							
Planned Accom.		Actual Accom.		Cumulative				Planned Accom.		Actual Accom.		Cumulative			
Area	Volume	Area	Volume	Planned		Actual		Area	Volume	Area	Volume	Planned		Actual	
				Area	Volume	Area	Volume					Area	Volume	Area	Volume
	MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu		MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M C

Fiscal Year 78								Fiscal Year 79							
Planned Accom.		Actual Accom.		Cumulative				Planned Accom.		Actual Accom.		Cumulative			
				Planned		Actual						Planned		Actual	
Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume
				Acres	MMBF/M Cu	Acres	MMBF/M Cu		MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu

Fiscal Year 80								Fiscal Year 81							
Planned Accom.		Actual Accom.		Cumulative				Planned Accom.		Actual Accom.		Cumulative			
Area	Volume	Area	Volume	Planned		Actual		Area	Volume	Area	Volume	Planned		Actual	
				Area	Volume	Area	Volume					Area	Volume	Area	Volume
	MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu		MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu

Fiscal Year 82								Fiscal Year 83							
Planned Accom.		Actual Accom.		Cumulative				Planned Accom.		Actual Accom.		Cumulative			
				Planned		Actual						Planned		Actual	
Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume
	MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu		MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu

Fiscal Year 84								Fiscal Year 85							
Planned Accom.		Actual Accom.		Cumulative				Planned Accom.		Actual Accom.		Cumulative			
Area	Volume	Area	Volume	Planned		Actual		Area	Volume	Area	Volume	Planned		Actual	
				Area	Volume	Area	Volume					Area	Volume	Area	Volume
	MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu		MMBF/M Cu			Acres	MMBF/M Cu	Acres	MMBF/M Cu

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GLOSSARY OF TERMS USED IN TIMBER PLANNING

Allowable Cut

The acreage of forest land, suitable and available under specified management plans for sustained production of timber products, that would be cut during a given period. The anticipated volume yield is expressed in million board feet. This term was used in plans written prior to 1972. Current planning breaks yield into "Potential Yield" and "Programmed Allowable Sell".

Climax Type

The ecological community which perpetuates itself without necessity of outside influence by man.

Commercial Thinning

Any type of thinning producing merchantable material at least to the value of the direct costs of harvesting.

Compartment

The basic territorial unit of the Forest permanently located and described for record keeping purposes. It is commonly a subdivision of a district.

Competition

The effect trees and other vegetation have on the growth of a specific crop tree.

Crop (or Leave Tree)

A tree designated to be left standing in an area where other trees are being removed. Usually these are the trees that will be the final harvest when the stand is harvested.

District

A managerial Forest division comprising a geographic area under one District Ranger. An administrative division of the National Forest.

Forest Land

Land at least 10% occupied; stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use.

Forested Deferred Land

Suitable forested land that has been administratively identified for study as possible additions to the Wilderness System or other withdrawal from timber utilization under authority granted in the Federal Code of Regulations.

Forested Reserved

Suitable forest lands withdrawn from timber utilization by statute administrative regulation (Federal Code of Regulations), or by designation in land use plans approved by the Regional Forester.

Habitat Type

A site described according to the climax tree species and undergrowth vegetation the area will support.

Inaccessible

An area of forest land suitable for timber production but not immediately available because the cost of building access roads is expected to exceed the monetary value of the first timber harvest. This term was used in plans prior to 1972. In plans written after 1972, inaccessability is used as a criteria for classification of commercial Forest land into the Marginal Component.

Inadequately Stocked

A stand with less than one-tenth of the accumulated basal stocking percent in desirable or acceptable growing stock trees. The area may be "open" or occupied with any number of undesirable trees of any size, but is "inadequately stocked" if it does not meet the ten percent criteria above.

Inoperable (also not Operable)

Forest lands suitable for timber production but not available for harvest due to steepness of slope, or other physical limitations. This term was used in plans written prior to 1972. The more recent plans use the term "Marginal".

Land

The area of dry land and land temporarily or partly covered by water; (example, marshes, swamps, etc.), and water areas not meeting definition of water.

Marginal Component

This component of the regulated forest land includes area not qualifying as standard or special components primarily because of excessive development cost, low product values or resource protection constraints. Included may be drainages requiring unusual logging techniques, such as helicopters, skyline logging systems, or areas where harvesting is blocked until government constructed roads are in place, or a particular product or particular species type is not presently in demand. Also included is the backlog of Inadequately stocked areas that would otherwise be classed as standard, but are in need of reforestation.

Modified

Forest land suitable and available for regulated timber production where harvesting or other normal silvicultural practices may be delayed beyond the optimum age or otherwise modified to satisfy scenic objectives. This term was used in plans written prior to 1972, but is not now in common use.

Mortality

Number or growing stock volume of live trees dying from natural causes during a specified period.

Multiple Use Management Zone

For planning purposes, areas of land with similar social, economic, and/or ecological characteristics.

National Forest Area

All government ownership within the proclaimed National Forest boundary administered by the Forest Service.

Nonforested Land

Land that has never supported forests and lands formerly forested where use for timber utilization is precluded by development for other uses. Also isolated tracts of forest land.

Operable

Forest land suitable and available for timber production on which the harvesting of timber products is economically feasible under existing local market and technological conditions.

Overstory (also Overwood)

That portion of the trees in a forest of more than one canopy level, forming the uppermost canopy layer.

Pathological Age

Point in the life cycle of a tree when changes, physiological and/or morphological, occur in the tree or its parts, generally irreversible and typically associated with a decline in growth and vigor.

Periodic Annual Growth or Increment

Average annual growth for a specified period. Usually computed based on ten years. Net periodic annual growth equals gross growth less annual mortality.

Poletimber

Growing stock trees of commercial species at least 5.0 inches in d.b.h., but smaller than sawtimber size.

Potential Yield

The potential yield over the next 10 years is the maximum harvest to achieve the optimum sustained yield level under intensive forestry on regulated areas - considering the productivity of the land, conventional logging technology, standard cultural treatments, and interrelationship with other resource uses and the environment.

Precommercial Thinning (also Noncommercial)

Removal of excess trees to maintain or increase growth on selected crop trees. The cost of removal is an expense not compensated by sale of excess trees removed. Precommercial is usually used with trees below merchantable size and noncommercial with trees of merchantable size but no local market.

Product Objective

Diameter goals that are both suitable and efficient for sawlog production and attainable under management on a given site or area.

Programmed Allowable Sell

That part of the potential yield that is scheduled for sell in a specific year. It is based on current demand, funding, silvicultural practices, and multiple use considerations.

Regeneration Cutting

Any removal of trees intended to assist regeneration already present or to make regeneration possible. Only one cut will be counted toward regeneration goals in a given rotation.

Regulated

Forest land that is suitable, available, and organized for timber production under sustained yield principles.

Rotation

The period of time in years between establishment of a stand of timber and the time it is considered mature either pathologically or economically and therefore ready for harvest.

Salvage

The harvest and utilization of trees that are dead, or dying, that would otherwise be left to decay.

Saplings

Live trees 1.0 inch to 5.0 inches in diameter at breast height.

Sawtimber

Live trees of commercial species at least 9.0 inches in d.b.h., containing at least a 12 foot sawlog and meeting Regional specifications for freedom from defect, except aspen must be at least 11.0 inches in d.b.h.

Seedlings

Live trees less than 1.0 inch in diameter at breast height that are expected to survive according to Regional standards.

Silviculture

Generally, the science and art of cultivating forest crops based on the study of the life history and general characteristics of forest trees and stands, with particular reference to local factors. More particularly, the theory and practice of controlling the establishment, composition, constitution and growth of forests.

Slash

The residue left on-the-ground after harvesting, cultural operations, windstorm, or fire. It includes unutilized logs, uprooted stumps, broken or uprooted stems, tops, branches, leaves, etc.

Special Component

The component of the regulated forest land that is recognized in the multiple use plan as needing specially designed treatment of the timber resource to achieve landscape or other key resource objectives. Areas where timber management activities are informally delayed pending multiple use planning studies and management decisions, travel and water influence zones, peripheral portions of developed sites, and classified recreation areas.

Special Zone

Areas classified or formally designated by the Congress, Secretary of Agriculture, Chief of the Forest Service, or Regional Forester. Wilderness, Archeological, and Natural Areas are included in this classification. Refer to Multiple Use Zone classification.

Stage II Inventory (also Compartment Examination)

An intensive survey or on-the-ground examination of a stand or area for the purpose of inventorying and prescribing management action and developing programs.

Stand

An aggregation of trees or other growth occupying a specific area and sufficiently uniform in composition, age arrangement, tree size, and condition to be distinguishable from the other growth on adjoining areas.

Standard Component

The component of the regulated forest land area on which crops of industrial wood can be grown and harvested with adequate protection of the forest resources under the usual provisions of the timber sale contract. This area includes stands of immature trees or areas not yet accessible, but which will be, in the future, under the normal course of events. This area is capable of producing timber crops that have a reasonable probability of demand under the accessibility and economic conditions projected for a 10-year plan period, even though portions of the area may not be developed during this period.

Stocking Control (also Thinning)

Manipulating number of trees to avoid over-stocked conditions which would detract from full growth potential.

Suitable Forest Land

Forest land which is producing or capable of producing crops of industrial wood. This includes areas suitable for management to grow crops of industrial wood generally of a site quality capable of producing in excess of 20 cubic feet per acre of annual growth. Suitable forest land can either be regulated or unregulated.

Sustained Yield

(As defined in the Multiple Use-Sustained Yield Act) The achievement and maintenance in perpetuation of a high-level annual or regular periodic output of the various renewable resources of the National Forest without impairment of the productivity of the land.

Unregulated

Forest land that is suitable and available but not organized for timber production under sustained yield principles; where timber harvest is permissible but not a goal of management, such as Experimental Forests, Ranger Stations, and isolated tracts so completely remote from manufacturing centers that organizing periodic harvest is impractical.

Unsuitable Forest Land

Forest land incapable of producing 20 cubic feet per acre per year of growth, but otherwise meets the definition of forest land.

Water

Streams, sloughs, estuaries and canals more than 120 feet wide; and lakes, reservoirs and ponds more than 1 acre in area.

Working Group

A working group is comprised of those forest timber types of a National Forest that have the same general management prescription.

COMPARTMENTS BY RANGER DISTRICT

DISTRICT	COMPARTMENT NUMBER	COMPARTMENT NAME	COMPARTMENT NUMBER	COMPARTMENT NAME
Conejos	001	Archuleta	007	Lower Conejos
	002	Chama	008	La Manga
	003	Los Pinos	009	Elk
	004	Osier	010	Conejos
	005	Bighorn	011	South Fork
	006	Fox	012	Saddle
Alamosa	013	Three Forks	022	Telluride
	014	Adams	023	Treasure
	015	Platoro	024	Wightman
	016	Lake	025	Jasper
	017	Trail	026	Cat Creek
	018	Jim	027	Rock
	019	Hot Creek	028	Raton
	020	Alamosa	029	Deadmans
	021	Fisher Gulch	096	Dunes
Del Norte	030	Frisco	042	Hope
	031	Bennett	043	Hunters
	032	Burro	044	Decker
	033	Pinos	045	Poison
	034	Schrader	046	Raspberry
	035	Wolf	072	Alder
	036	Willow	073	Bear
	037	Beaver	074	Embargo
	038	Mill	075	Old Woman
	039	Park	076	Lower La Garita
	040	Pass	077	La Garita
	041	Spruce		
Creede	047	Goose	060	Pole
	048	Fisher	061	Lost Trail
	049	Pierce	062	Crooked
	050	Deep	063	Hermit
	051	Ivy	064	Clear
	052	Red	065	Bristol
	053	Trout	066	Shallow
	054	Fern	067	Miners
	055	Texas	068	Mammoth
	056	Upper Rio Grande	069	Farmers
	057	Reservoir	070	Bellows
	058	Starvation	071	Blue
	059	Quartzite		

DISTRICT	COMPARTMENT NUMBER	COMPARTMENT NAME	COMPARTMENT NUMBER	COMPARTMENT NAME
Saguache	078	Cave	087	Saguache
	079	Carnero	088	Luders
	080	Tracy	089	Sheep
	081	Houselog	090	Middle
	082	Squaw	091	Ford
	083	California	092	Kerber
	084	Johns	093	San Luis
	085	Sheep Mountain	094	Hayden
	086	Stonecellar	095	Crestone

INDEX OF RAM COMPUTER RUNS USED IN PLAN

NUMBER	DATED	DESCRIPTION
E1-2	3/24/75	Standard/Special/Marginal/Unregulated Yield
E2	3/20/75	Standard/Special/Marginal/Unregulated/Deferred Yield
B2E-2	3/24/75	Standard/Special/Marginal Yield
B3E-2	3/7/75	Standard/Special/Marginal Yield in Cubic Feet
B3E-2A	3/20/75	Standard/Special/Marginal Yield in Cubic Feet
C5E	3/20/75	Standard/Special Yield
C5E-1	3/3/75	Standard/Special Yield in Cubic Feet
D1E	3/20/75	Standard/Special/Aspen Yield
D1E-2	3/20/75	Standard/Special/Marginal/Aspen Type Yield
D2E2	3/20/75	Standard/Special/Total Planting Backlog Yield
D3E	3/20/75	Standard/Special/5M Planting Backlog Yield
D4E	3/20/75	Standard/Special/10M Planting Backlog Yield
D8E	3/28/75	Standard/Special/19M Planting Backlog Yield
D9E	3/18/75	Standard/Special/44M Planting Backlog Yield
D5E	3/4/75	Standard/Special/Steep Slope Yield
D7E	3/3/75	Standard/Special/Erosion Areas Yield
B5	5/21/75	Standard/Special/Marginal/19M Mandatory Plant 19 M Acres of Backlog First Decade Yield
D15	5/21/75	Timber Stand Improvement Backlog
D18	7/10/75	Testing Feasibility of final potential yield mix of treatments between Standard and Special Components

RAM RUN YIELDS

Rio Grande National Forest - 09

Effective Period FY 75 Thru 84

RAM RUN SUMMARY FOR STANDARD, SPECIAL AND MARGINAL

	Acres	Sawtimber		Products	
	M	M Cunits	MMBF	M Cunits	M Cords
Standard - Total	98.0	583.6	284.83	262.8	292.0
Group, Patch Strip Shelterwood	13.0	96.5	47.10	60.3	67.0
Preparatory	20.2	78.6	38.37	37.2	41.3
Overstory Removal	64.8	408.5	199.36	165.3	183.7
Reforestation	(6.0)	--	---	---	---
Special - Total	2.0	13.1	6.40	10.3	11.4
Group, Patch and Strip	2.0	13.1	6.40	10.3	11.4
Marginal - Total	24.4	135.8	66.27	55.1	61.2
Group, Patch, Strip Shelterwood	3.0	21.9	10.70	6.5	7.2
Preparatory					
Overwood Removal	21.4	113.9	55.57	48.6	54.0
Reforestation 1/	(19.0)	(6.4)	(3.10)	(3.25)	(3.6)
TSI 2/	(9.4)	(9.7)	(4.72)	(4.95)	(5.5)
Commercial Thinning 2/	(40.6)	(41.7)	(20.38)	(21.37)	(23.7)
Total Potential Yield (S, S&M)	124.4	732.5	357.50	328.2	364.6
Unregulated Estimated Salvage	Various	102.0	50.0	Not Estimated	

1/ Increases due to this activity are earned at the rate of 62 bd. ft. per acre per year for each acre reforested since plan revision and will be harvested from standard areas. Reflects net effect on potential yield and not necessarily growth response on a given acre.

Yields from the first 6,000 acres of reforestation are included in the yields for Standard and Special. Increases for reforestation in excess of 6,000 acres will be added up to a maximum of 5,000 acres.

2/ Increases due to these activities are earned at the rate of 502 bd. ft. for each acre accomplished the previous full fiscal year and will be harvested from standard areas. Increases may be added for a maximum of 50,000 acres.

(Based on RAM Runs B2E2, D15 and D3E)

RAM RUN YIELDS

Rio Grande National Forest - 09

Effective Period FY 75 Thru 84

RAM RUN SUMMARY FOR STANDARD AND SPECIAL COMPONENTS

	Acres	Sawtimber		Products	
	M	M Cunits	MMBF	M Cunits	M Cords
Standard - Total	73.2	438.2	213.86	167.55	186.2
Group Patch, Strip Shelterwood	14.2	104.3	50.88	25.52	28.4
Preparatory	13.9	54.1	26.41	37.90	42.1
Overstory Removal	45.1	279.8	136.57	104.13	115.7
Reforestation	(6.0)	(Affects other yields)			
Special - Total	6.7	35.9	17.51	15.52	17.2
Group, Patch, Strip Shelterwood	.7	4.3	2.11	3.27	3.6
Preparatory	4.0	18.9	9.20	7.55	8.4
Overstory Removal	2.0	12.7	6.20	4.70	5.2
Marginal - Total	(69.0)	(57.8)	28.20	(29.57)	32.8
Reforestation 1/	(19.0)	(6.4)	(3.10)	(3.25)	(3.6)
TSI 2/	(9.4)	(9.7)	(4.72)	(4.95)	(5.5)
Commercial Thinning 2/	(40.6)	(41.7)	(20.38)	(21.37)	(23.7)
Total Potential Yield (S&S)	79.9	474.1	231.37	183.07	203.4
Unregulated Estimated Salvage	Various	102.0	50.0	Not Estimated	

1/ Increases due to this activity are earned at the rate of 62 bd. ft. per acre per year for each acre reforested since plan revision and will be harvested from standard areas. Reflects net effect on potential yield and not necessarily growth response on a given acre.

Yields from the first 6,000 acres of reforestation are included in the yield for Standard and Special. Increases for reforestation in excess of 6,000 acres will be added up to a maximum of 5,000 acres.

2/ Increases due to these activities are earned at the rate of 502 bd. ft. for each acre accomplished the previous full fiscal year and will be harvested from standard areas. Increases may be added for a maximum of 50,000 acres.

(Based on RAM Runs D15, D18 and D3E)

CONVERSION FACTORS

TOTAL NET LIVE GROWING STOCK VOLUME BY SPECIES GROUP

(See column definitions below)

	1	2	3	4	5
True firs	.9006	.0994	4.5156	5.6507	1.2514
Engelmann Spruce	.9067	.0933	5.0529	6.0744	1.2022
Blue Spruce	.9030	.0970	4.9892	6.0516	1.2129
Pine-Other	.9126	.0874	3.9073	4.9568	1.2686
Lodgepole Pine	.9000	.1000	---	---	---
Douglas Fir	.9187	.0813	4.0773	5.1627	1.2662
Aspen	.7600	.2400	5.4160	6.8413	1.2632
Total	.9043	.0957	4.8799	5.9275	1.2147

Column 1 Relationship of sawlog cubic volume to cubic volume of tree to 4" top.

Column 2 Relationship of topwood volume to total volume in tree to 4" top. (Topwood volume is volume from sawtimber top to 4" top).

Column 3 Conversion factor for converting cubic feet to Scribner board feet.

Column 4 Conversion factor for converting cubic feet to International board feet.

Column 5 Conversion factor for converting Scribner to International board feet.

CONDITION CLASS

Condition Class 10

This is an area 100 percent stocked with desirable trees but not overstocked. Stands in this category do not require any treatment at present to maintain a high level of growth and vigor.

Condition Class 20

Areas stocked over 100 percent with desirable trees are in this category. These stands usually need treatment, such as thinning, to produce maximum potential growth.

Condition Classes 30 and 40

Areas 60 to 100 percent stocked with desirable trees. Class 30 has less than 30 percent of the area controlled by acceptable growing stock, culls, inhibiting vegetations and nonstockable conditions; class 40 has more than 30 percent of the area controlled by the above. Stands under these conditions have little prospect for improvement without special treatment, such as thinning and cull tree removal.

Condition Classes 50 and 60

Areas stocked with less than 60 percent of desirable trees. If the area is 100 percent stocked with growing stock trees, it is class 50, if only 60 to 100 percent stocked with growing stock trees, it is class 60. Neither of these conditions have much chance of improvement without cultural treatment.

Condition Class 70

Stands with less than 60 percent stocking of desirable trees and less than 60 percent stocking of growing stock trees. These areas usually require regeneration to fully utilize the site potential.

Condition Classes 80 and 90

These are low and high risk old growth stands respectively. Class 80 has a plurality of desirable trees and 90 a plurality of acceptable trees.

AREA OF COMMERCIAL FOREST LAND
BY
CONDITION CLASS AND TYPE 1/

TYPE	CONDITION CLASS 40	50	60	70
Spruce fir	82,806	141,296	186,852	146,939
Ponderosa Pine				31,331
ouglas fir-white fir	14,346	26,110	48,357	29,112
White pine		15,010		
Lodgepole Pine	12,184		6,963	
Aspen	15,392	67,498	93,391	93,331
Totals	124,728	249,914	325,563	300,713

1/ Inventoried area at time of 1968 inventory.

AREA OF COMMERCIAL FOREST LAND
BY
SITE INDEX 1/

Type	10-19	20-29	30-39	40-49	50 +
Spruce Fir	7,902	137,163	255,692	84,394	7,108
Ponderosa		12,184	12,184	6,963	
Douglas Fir-White Fir		45,256	43,457	29,211	
White Pine			7,108		
Lodgepole		12,184			
Aspen	16,859	27,049	77,839	65,853	32,250
Totals	24,761	233,836	396,280	186,421	39,358

1/ Inventoried area at time of 1968 inventory.

AREA BY TYPE AND YIELD

CLASS 1/

Type	Annual Cubic Feet Per Acre Potential 0 - 19	20 - 49	50+
Spruce fir		294,234	263,558
Ponderosa		24,368	6,963
Douglas Fir-White Fir		66,985	50,939
White Pine		15,010	
Lodgepole Pine		19,147	
Aspen	16,859	120,341	132,412
Totals	16,859 2/	540,184	453,873

1/ Inventoried area at time of 1968 inventory

2/ Site trees used were inadequate to reflect the true site capability of this 16,859 acres due to old age and form. Although the inventory compilation used the available site trees to classify the area into 0-19 site class, other analysis determined that the area is capable of producing a minimum of 20 cubic feet per acre per year of wood. Therefore, the area is considered commercial forest land.

AREA OF COMMERCIAL FOREST LAND
BY
TYPE AND RISK CLASS 1/

(Sawtimber)

	CLASS				
	1	2	3	4	5
Spruce Fir	29,730	0	78,225	163,413	101,137
Ponderosa	0	0	0	0	0
Douglas Fir-White Fir		26,530	6,963	29,211	6,963
White Pine	7,902	7,108			
Lodgepole		6,963			
Aspen	15,345	12,184	23,187	15,392	15,812
Totals	52,977	52,784	108,375	208,016	123,912

RISK CLASS 1 - Insufficient stocking to determine a risk class.

RISK CLASS 2 - 0-25% of total tree stocking in trees with low risk characteristics

RISK CLASS 3 - 25-50% of total tree stocking in trees with low risk characteristics.

RISK CLASS 4 - 50-75% of total tree stocking in trees with low risk characteristics.

RISK CLASS 5 - 75-100% of total tree stocking in trees with low risk characteristics.

1/ Inventoried area at time of 1968 inventory.

REGULATED FOREST AREA
BY
TYPE, STAND SIZE AND COMPONENT

STANDARD COMPONENT

ACRES

	ST	PT	S/S	N/S	TOTAL
Spruce Fir	210,748	33,914	26,535	6,000	277,197
Ponderosa Pine	0	0	0	0	0
Douglas Fir	46,980	13,416	0	0	60,396
White Pine	0	0	0	0	0
Lodgepole Pine	4,892	0	8,561	0	13,453
Aspen	0	0	0	0	0
Total	262,620	47,330	35,096	6,000	351,046

SPECIAL COMPONENT

Spruce Fir	21,419	3,071	2,366	0	26,856
Ponderosa Pine	0	0	0	0	0
Douglas Fir	4,142	1,203	0	0	5,345
White Pine	0	0	0	0	0
Lodgepole Pine	429	0	752	0	1,181
Aspen	0	0	0	0	0
Total	25,990	4,274	3,118	0	33,382

MARIGINAL COMPONENT

Spruce Fir	67,487	9,144	7,546	79,623	163,800
Ponderosa Pine	0	11	0	30,255	30,266
Douglas Fir	17,094	4,956	0	26,025	48,075
White Pine	0	0	0	0	0
Lodgepole Pine	1,403	73	2,454	0	3,930
Aspen	0	0	0	0	0
Total	85,984	14,184	10,000	135,903	246,071

TENTATIVE COMPARTMENTS ENTRY SCHEDULE

SCHEDULED ENTRY	DISTRICT				
	ALAMOSA	CONEJOS	CREEDE	DEL NORTE	SAGUACHE
1975	013	005	071	035	078
	015	006	054	036	079
	016		063	037	081
	019		064	039	082
	020			040	083
	021			041	089
	023			042	092
	026			072	
	027			073	
				074	
				077	
1976	016	005	057	031	078
	018	006	062	032	079
	019	007	050	033	081
	020	008		035	082
	023	012		036	088
	024			037	089
	025			038	092
	027			037	095
				040	
				041	
				042	
				044	
				072	
				073	
				076	
				077	
1977	020	004	070	030	079
	023	005	053	031	082
	019	006	048	032	083
		007	049	033	088
		010		034	089
				036	092
				037	093
				038	095
				039	
				043	
				045	
				072	
				073	

CEDULED TRY	DISTRICTS				
	ALAMOSA	CONEJOS	CREEDE	DEL NORTE	SAGUACHE
1978	024	004	051	031	081
	026	007	052	032	093
	027	008	047	033	095
				034	
				045	
				077	
1979	016	009	061	035	084
	018		060	036	091
	021		065	037	095
				038	
				039	
				046	
				077	
1980	025	010	066	030	080
	028		067	041	090
				042	091
				043	
				044	
				077	
1981	029	011	068	040	086
	022		069	072	094
	015			073	
				074	
1982	014	011	055	046	087
	017		056	074	094
				075	
				077	
1983	013	011	058	075	085
	015	012	059	076	
	016		072		
	019				
	020				
	021				
	023				
	026				
	027				
1984	016	011	071	035	085
	018		054	036	095
	019		063	037	
	020		064	039	
	023			040	
	024			041	
	025			042	

CEDULED ENTRY (Con't)	DISTRICTS ALAMOSA	CONEJOS	CREEDE	DEL NORTE	SAGUACHE
1984	027			072 073 074 077	

Compartments entered more than one year indicates less than all sub-compartments are planned for entry in that year.